SAN FRANCISCO

DEPARTMENT OF CITY PLANNING 100 LARKIN STREET · SAN FRANCISCO, CALIFORNIA 94102

SAN FRANCISCO

DRAFT ENVIRONMENTAL IMPACT REPORT

Proposed Pacific Gateway Office Building Project

San Francisco, California

APR 17 1979

DOCUMENTS DEPT.
CA[illegible] PUBLIC L[illegible]

EE78.61

Public Comment Period: 6 April to 10 May 1979

Public Hearing: 10 May 1979

Written comments should be sent to the Environmental Review Officer, 45 Hyde Street, San Francisco, CA 94102

5/S

SAN FRANCISCO
PUBLIC LIBRARY

REFERENCE
BOOK

Not to be taken from the Library

SAN FRANCISCO PUBLIC LIBRARY
3 1223 03629 9155

SAN FRANCISCO DEPARTMENT OF CITY PLANNING 100 LARKIN STREET · SAN FRANCISCO, CALIFORNIA 94102

DRAFT ENVIRONMENTAL IMPACT REPORT

Proposed Pacific Gateway Office

Building Project

San Francisco, California

EE78.61

Public Comment Period: 6 April to 10 May 1979

Public Hearing: 10 May 1979

Written comments should be sent to the Environmental Review Officer, 45 Hyde Street, San Francisco, CA 94102

D REF 711.4097 P945d

Proposed Pacific Gateway
office building
1979.

S.F. PUBLIC LIBRARY

3 1223 03629 9155

CONTENTS

Page

List of figures iii

Summary iv

I. Project description

1. Location and site characteristics 1
2. Objectives 1
3. General characteristics. 4
4. Project scheduling 11
5. Relation to plans; agency approvals. 11

II. Local and Regional Environmental Setting

1. Geology, soils, seismicity and hydrology 12
2. Traffic, transportation, circulation and parking . 14
3. Climate and air quality. 27
4. Noise. 30
5. Aesthetics 31
6. Vegetation and wildlife. 32
7. Energy Consumption 32
8. Land use 32
9. Historical and archeological resources. 34
10. Economic environment 35

III. Local and Regional Environmental Impacts

1. Geology, soils, seismicity and hydrology 39
2. Traffic, transportation, circulation and parking . 39
3. Climate and air quality. 52
4. Noise. 60
5. Aesthetics 61
6. Energy Consumption 67
7. Land use 70
8. Community services 70
9. Historical and archeological resources 74
10. Economic environment 75
11. Relationship between short-term uses of the environment and the maintenance of long-term productivity 79
12. Irreversible environmental changes 79
13. The growth-inducing impact of the project. 80

CONTENTS
(continued)

		Page
IV.	Mitigation Measures	
	1. Energy mitigation measures	81
	2. Other impacts	82
V.	Unavoidable Adverse Environmental Impacts	87
VI.	Alternatives	
	1. No project	88
	2. Other site uses	88
	3. Alternative designs.	90
	4. Develop at a later date.	92
	5. Alternative pedestrian access	93
VII.	EIR Authors; Organizations and People Consulted	94
VIII.	Distribution List	97
IX.	Bibliography.	100
	Appendices	
	A. Microclimate impact study	102
	B. Traffic and circulation impact study	119
	C. Air quality appendix	158
	D. Sun reflection study	163
	E. Fundamental concepts of environmental noise.	169
	F. Previous site disturbance.	175

FIGURES

		Page
1.	Site location	2
2.	Site photograph	3
3.	Site plan	5
4.	Elevation	6
5.	Perspective view of proposed building	7
6.	Floor plan	8
7.	Garage plan, first floor	9
8.	Garage plan, second floor	10
9.	Street network	15
10.	Transit routes	19
11.	Pedestrian access and counts	25
12.	Local land use and access	33
13.	Traffic, pedestrian volumes	50
14.	Regional view	64
15.	Regional view	65
16.	Regional view	56
17.	Daily and annual natural gas consumption	59
18.	Daily and annual electricity use	71

SUMMARY

The Southern Pacific Transportation Company proposes to construct a 33-story office building, adjacent 2-level parking structure and a public plaza in a C-3-0 zoning district on the southern edge of the San Francisco Central Business District. The project site is currently a parking lot for Southern Pacific employees. The site is bounded by Mission Street, Howard Street, Main Street and Beale Street. Freeway ramps bound the site on the east and west, paralleling Main Street and Beale Street.

The proposed office building would be 443 feet tall and 142 feet on a side. It would have a total building floor area of 661,200 sq. ft. It would contain 564,000 sq. ft. of rentable office space and 7,550 sq. ft. of rentable commercial space on the ground floor. The project would accommodate 2,500 to 2,900 permanent employees.

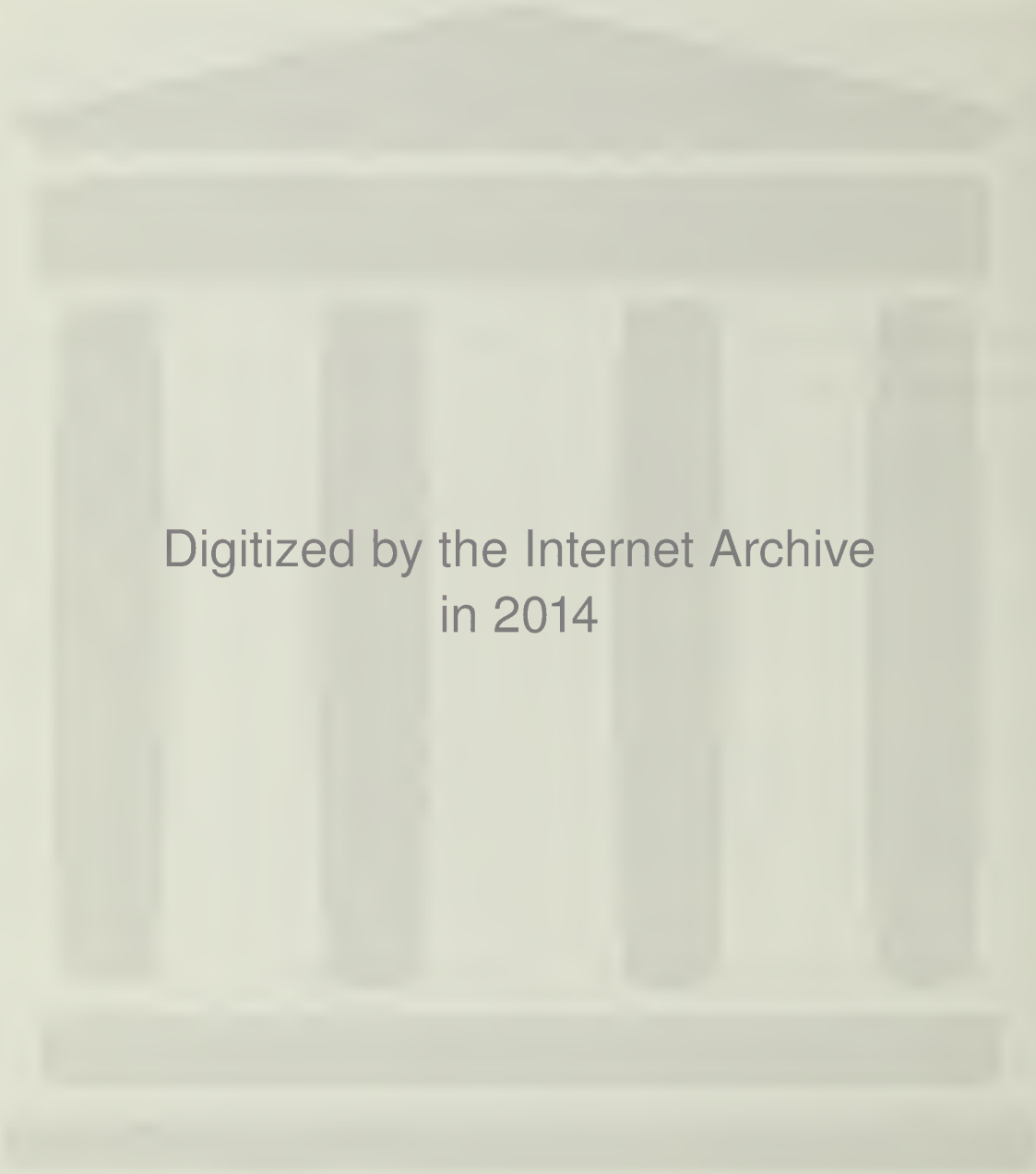
The two level parking area would occupy the southern half of the site. It would be constructed of pre-cast concrete; the upper deck would be landscaped. The garage would have a total of 155 spaces.

The project would increase traffic volumes and air pollution in the project vicinity. The building would increase shadows near the site, and would modify the skyline of Downtown San Francisco as viewed from Twin Peaks and Potrero Hill. The project would increase energy use. Natural gas consumption during the peak month would be 47,200 cubic feet per day. Average daily electrical consumption would be 27,800 kilowatt hours.

The project would generate 11,400 person trips per day, and 2,500 person trips during the peak hour. Approximately 60% of all trips would be made on transit. Ridership on all transit systems would increase.

The proposed project would provide approximately 300 person-years of employment in the construction trades, with a payroll of $11 million. Property taxes, payroll levies and retail sales tax generated by the project are estimated at $670,000-$770,000 annually.

Mitigation measures incorporated in the project include design measures to avoid seismic hazards and landscaping to mitigate vegetation losses. The heating, cooling, lighting and ventilation system incorporates design measures to reduce energy consumption. These include insulation, double glazed windows, fluorescent lighting, and local light switching.



Digitized by the Internet Archive
in 2014

https://archive.org/details/proposedpacificg1979sanf

I. PROJECT DESCRIPTION

1. LOCATION AND SITE CHARACTERISTICS

The Pacific Gateway Project would be located on the east side of Mission Street between Main Street and Beale Street (see Figure 1). The site is bounded on the east and west by freeway ramps paralleling Main and Beale Streets and on the south by Howard Street. The site is located on what is currently the southern extreme of downtown San Francisco. The parcel is Assessor's Block 2718, lot 26.

The site is currently a nearly level, paved parcel (see Figure 2), used as parking for Southern Pacific employees. Several railroad tracks are on the site. A billboard and a trailer used by the parking lot attendant are located at the northern end of the parcel.

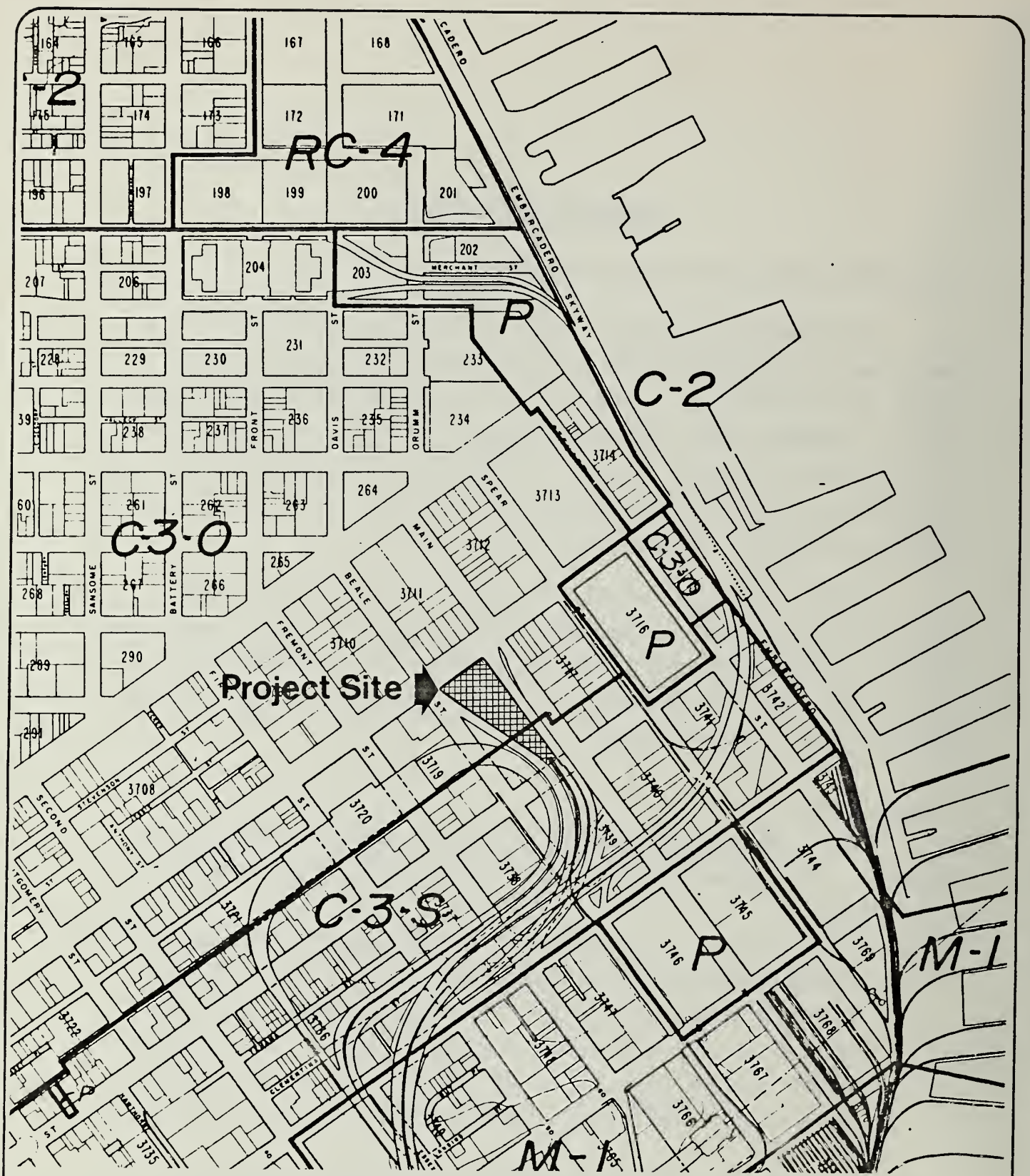
2. OBJECTIVES

The project sponsor is Southern Pacific Development Company. The sponsor's objectives in developing the site are to provide:

a. office space for tenants and Southern Pacific employees. Southern Pacific employees are currently located in several locations in San Francisco. Some of these buildings are scheduled for demolition. The project would consolidate these offices. It is not known how much of the building's space would be used by Southern Pacific.

b. an energy-efficient building that would lease for less than other new buildings

c. a building that would minimize long term maintenance costs



Site Location Map (with zoning indicated)

Scale in Feet 0 250 500 1,000

N

FIGURE 1

Project Site,
Corner Mission & Main Streets

FIGURE 2

d. limited on-site parking for Southern Pacific employees and tenants
e. a return on invested capital

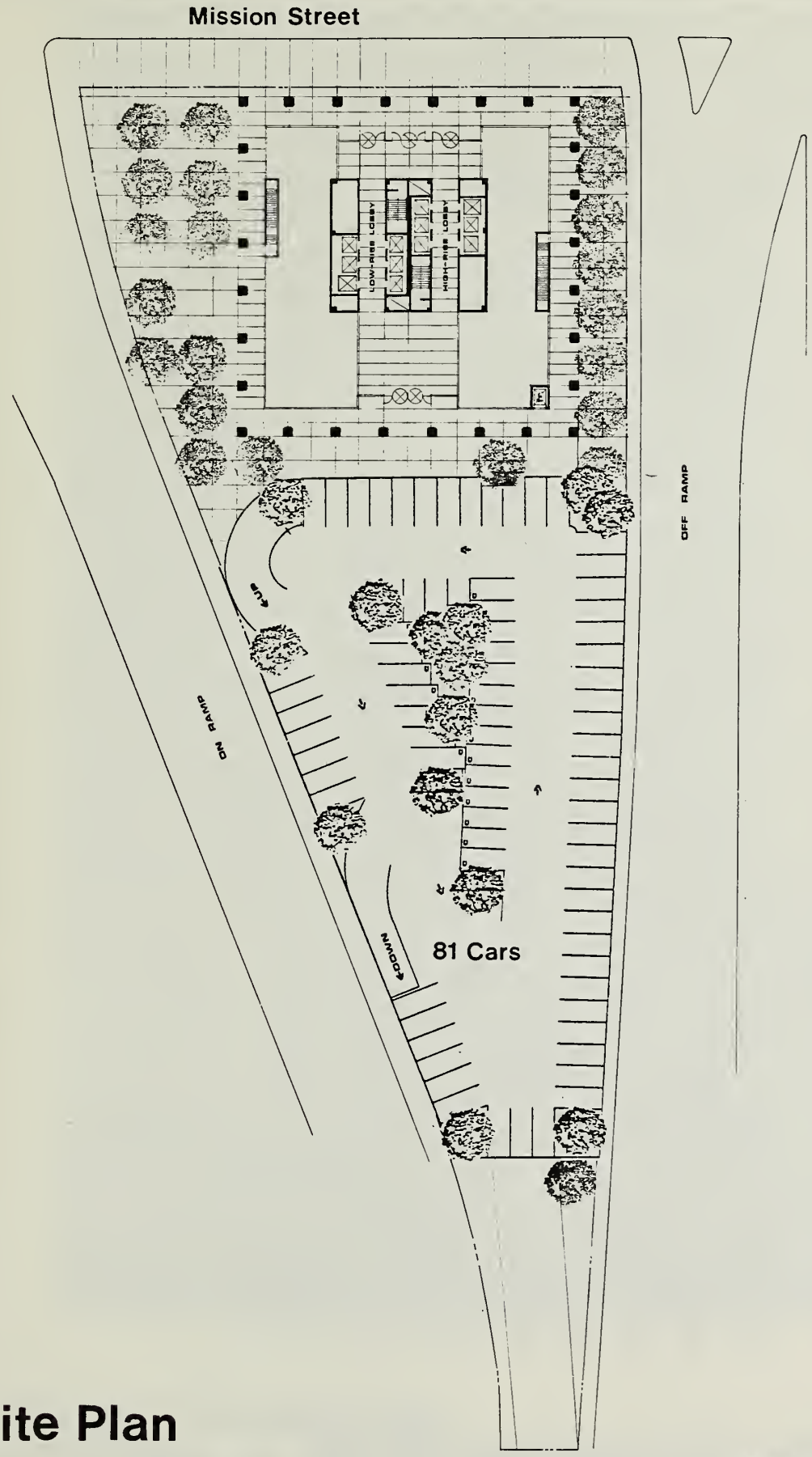
3. GENERAL CHARACTERISTICS

The project would consist of a 33 story-high building, adjacent 2-level parking structure, public plaza and general landscaping. The building would be 443 feet tall, and would be located adjacent to Mission Street (Figures 3-5). Its horizontal cross section would be a square 142 feet on a side. Total building area would be 661,200 square feet. The building would contain 572,000 square feet of rentable floor area, of which 564,000 square feet would be office space on floors 2 through 32, and 7,550 square feet would be commercial space on the ground floor (Figure 6, page 8). As the ground floor commercial area has not been pre-leased, it is not known what types of commercial uses would be located in the building.

The building would be a steel frame structure, with a relatively light-colored skin of pre-cast reinforced concrete. Windows would be tinted, double-glazed, thermal insulated glass which would be partially revealed; windows would be inset 1 foot beyond building facade (Figure 5). Windows would comprise about 27% of the building surface.

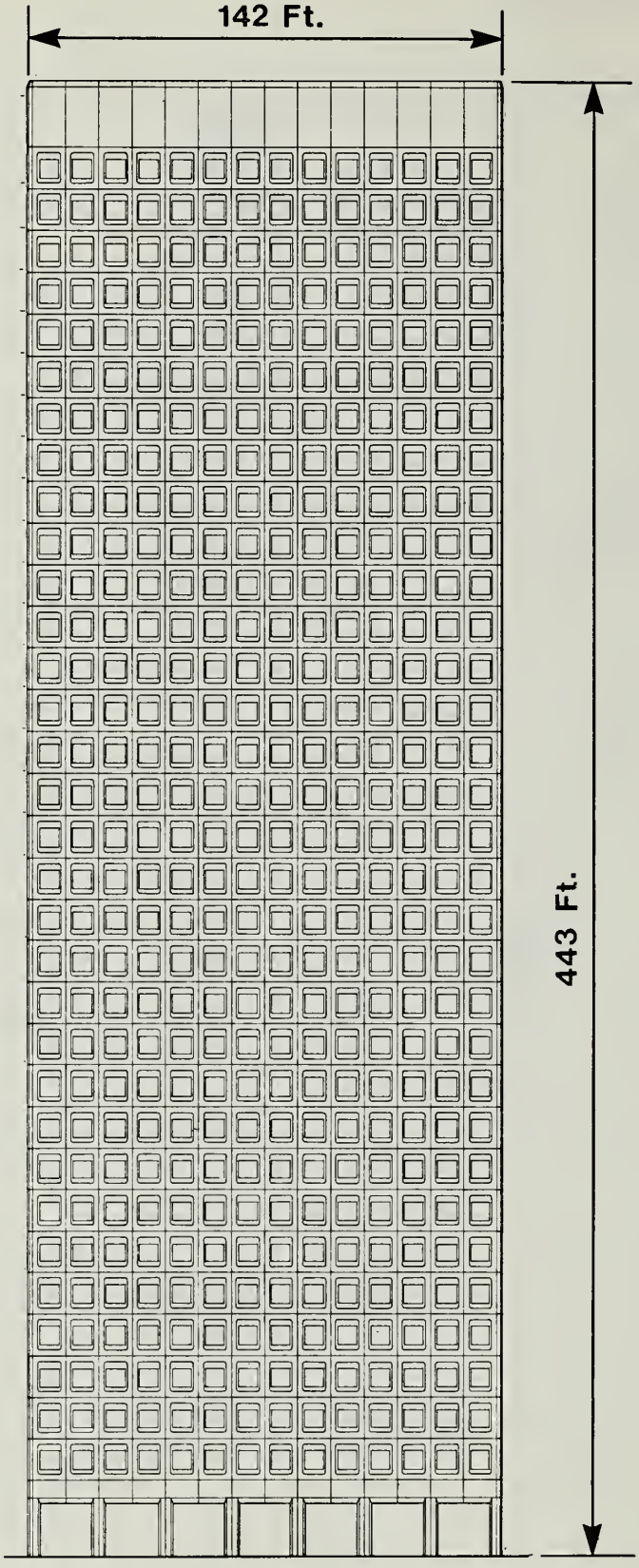
The ground floor facade would be set back, with columns extending from the second floor to the ground. The area around the building would be landscaped with concrete bricks, trees and ground cover. At the west end of the site there would be a plaza with trees and a sculpture podium. A 30 foot wide loading area would be at the southeast corner of the building.

A two-level parking area (one deck and ground level) would occupy the southern half of the site (Figures 7 and 8). It would provide unassigned, tenant parking spaces. The



Site Plan

FIGURE 3



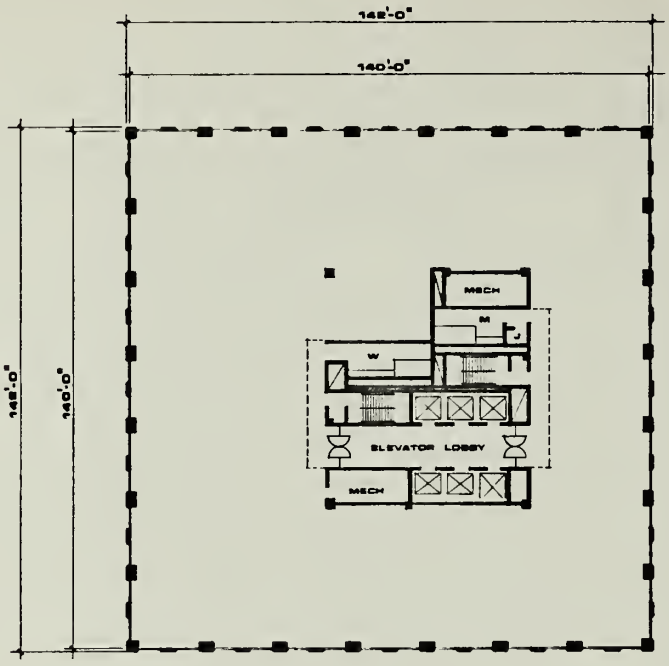
Elevation, Typical Four Sides

Scale in Feet 0 25 50

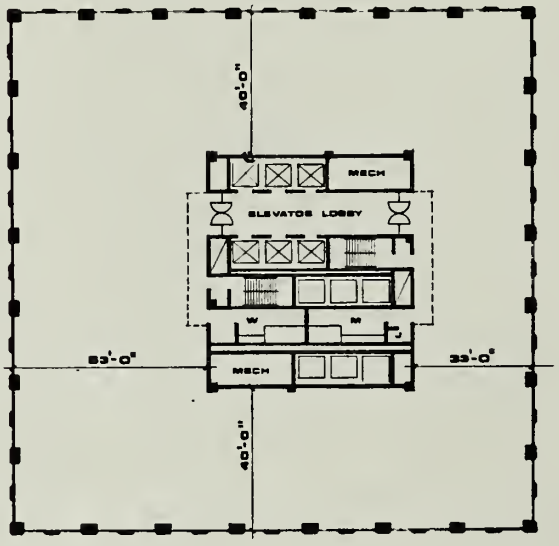
FIGURE 4

Building Perspective, North Face at Mission Street

FIGURE 5



HIGH RISE PLAN (Floors 18-33)



LOW RISE PLAN (Floors 1-17)

Floor Plan

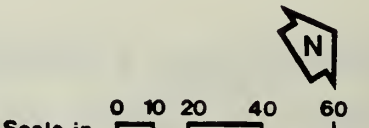
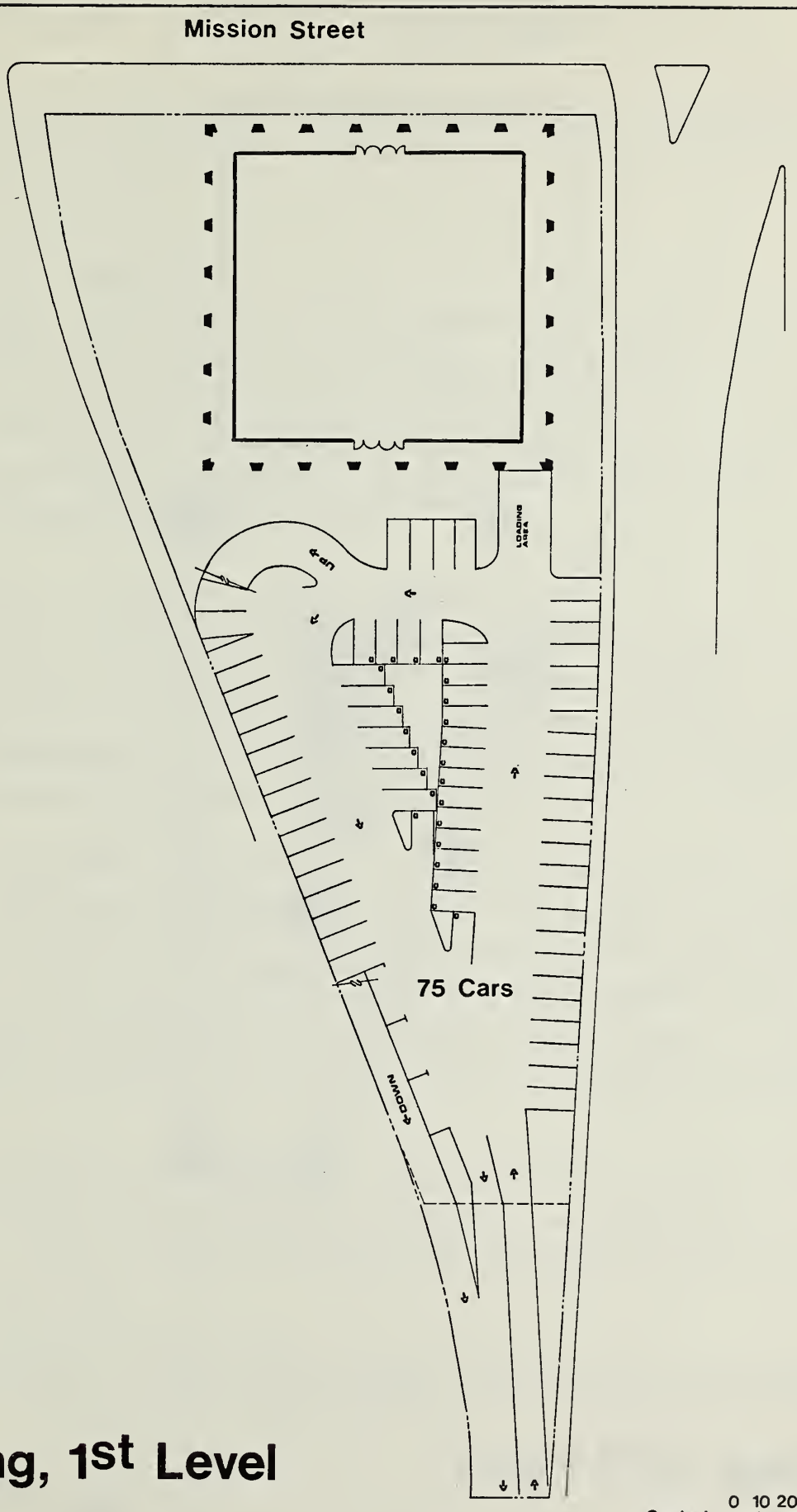


FIGURE 6

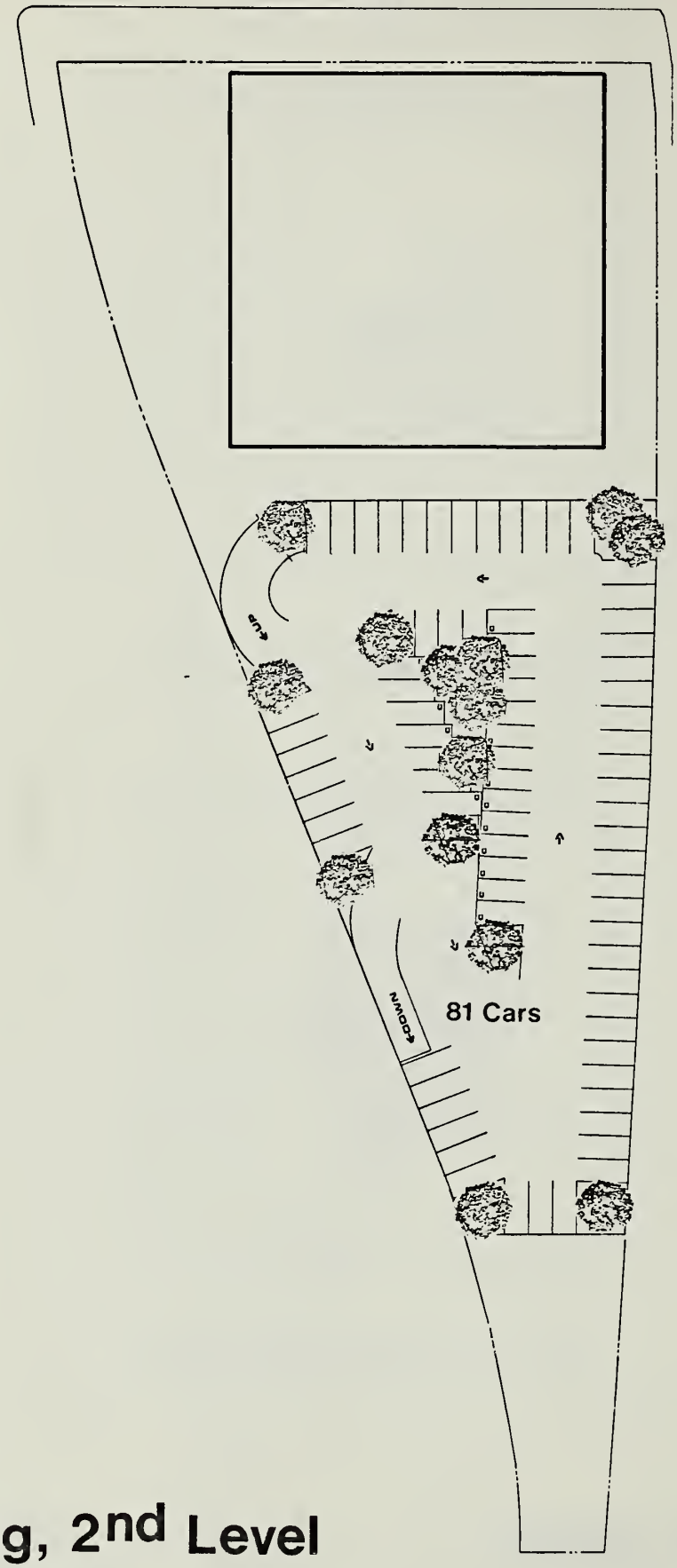


Parking, 1st Level

N

Scale in Feet 0 10 20 40 60

FIGURE 7



Parking, 2nd Level

Scale in Feet 0 10 20 40 60

FIGURE 8

deck would be constructed of pre-cast concrete, and the upper level would be landscaped. Access to the parking area would be from Howard Street.

4. PROJECT SCHEDULING

Upon completion of permit requirements, it is estimated that construction would take 22 months. Site grading and excavation would take 3 months; foundation construction 4 months; erection of the steel frame 5 months; completion of the superstructure 19 months; and completion of the life safety system 17 months.

5. RELATION TO PLANS; AGENCY APPROVALS

The site is zoned C-3-0; Downtown Office District, and C-3-S; Downtown Support District (Figure 1, page 2). The proposed uses of the site would be compatible with this zoning, and no variances or conditional use permits would be required for the proposed project.

The height and bulk zoning for the site is 500-I, which allows a maximum building height of 500 ft., with a maximum building width of 170 ft. and a maximum diagonal dimension of 200 ft. above the height of 150 ft. The proposed building would be 443 ft. high and have a width of 142 ft. and a diagonal dimension of 200 ft. at 150 ft. This is within the maximum allowable.

Discretionary review has been requested for the project.[1] If this review by the Planning Commission is required, it normally occurs at the same meeting as Commission certification of the Final EIR.

---

[1]Letter from Robert Tibbetts, San Francisco Tomorrow, to Spencer Steele, Zoning Administrator, dated 27 April 1978.

II. LOCAL AND REGIONAL ENVIRONMENTAL SETTING

1. GEOLOGY, SOILS, SEISMICITY AND HYDROLOGY[1]

The project site was originally under the waters of the San Francisco Bay. In the mid to late 1800's, the downtown shoreline was progressively extended to the east by filling with sand and building debris. Immediately after placement of fill, the Bay mud began to consolidate under the weight of fill, resulting in subsidence of the area. After the 1906 earthquake, additional fill was placed where localized subsidence had occurred. A review of settlement records maintained by the City of San Francisco and of consolidation test data indicates that subsidence is nearly complete in the vicinity of the proposed building. The placement of any additional fill or structural loads upon the Bay mud would induce new settlement which would then continue at a decreasing rate for years.

An interpretation of the subsurface conditions based on all test borings available is summarized below in Table 1.

The ground water level at the time of test boring was approximately 11 feet (Elevation -10) below present ground surface.

The major active faults in the San Francisco Bay Region are the San Andreas, Hayward, and Calaveras Faults.[2] Seismic

---

[1]Harding-Lawson Associates, Foundation Investigation Pacific Gateway Office Building, San Francisco, HLA Report No. 3343,022.04, 1978.

[2]See Figure 27, Yerba Buena Center EIR, EE77.220.

activity occurring on the San Andreas and Hayward Faults would be the main energy source of ground motion at the site. The building site is about 10 miles northeast of the San Andreas Fault and 12 miles southwest of the Hayward Fault.

TABLE 1

SUMMARY OF SOIL CONDITIONS

Approximate Depth Below Ground Surface (feet)			Soil Types and Descriptions
Minimum	Typical	Maximum	
0-13	0-18	0-20	Sand Fill - Loose to medium dense sand, variable in both density and amount of debris. Wood piling rubble and building debris probably scattered throughout.
13-56	18-58	20-59	Soft Silts - Low strength and highly compressible. A geologically recent deposit containing shells, organic matter, irregular lenses of clean, fine sand and zones of increasing sand content (Bay mud).
56-82	58-90	59-92	Dense Sands - The fine-grained sands are dense to very dense, of high strength and low compressibility.
82-169	90-189	92-198	Old Bay Silts and Clays - Weaker and more compressible than the immediately overlying sands. Of moderate strength, as compressible as the Bay mud, but preconsolidated to a higher load than the existing overburden pressure.
169	189	198	Highly Sheared and weathered rock. Intensely fractured.

2. TRAFFIC, TRANSPORTATION, PARKING, AND CIRCULATION

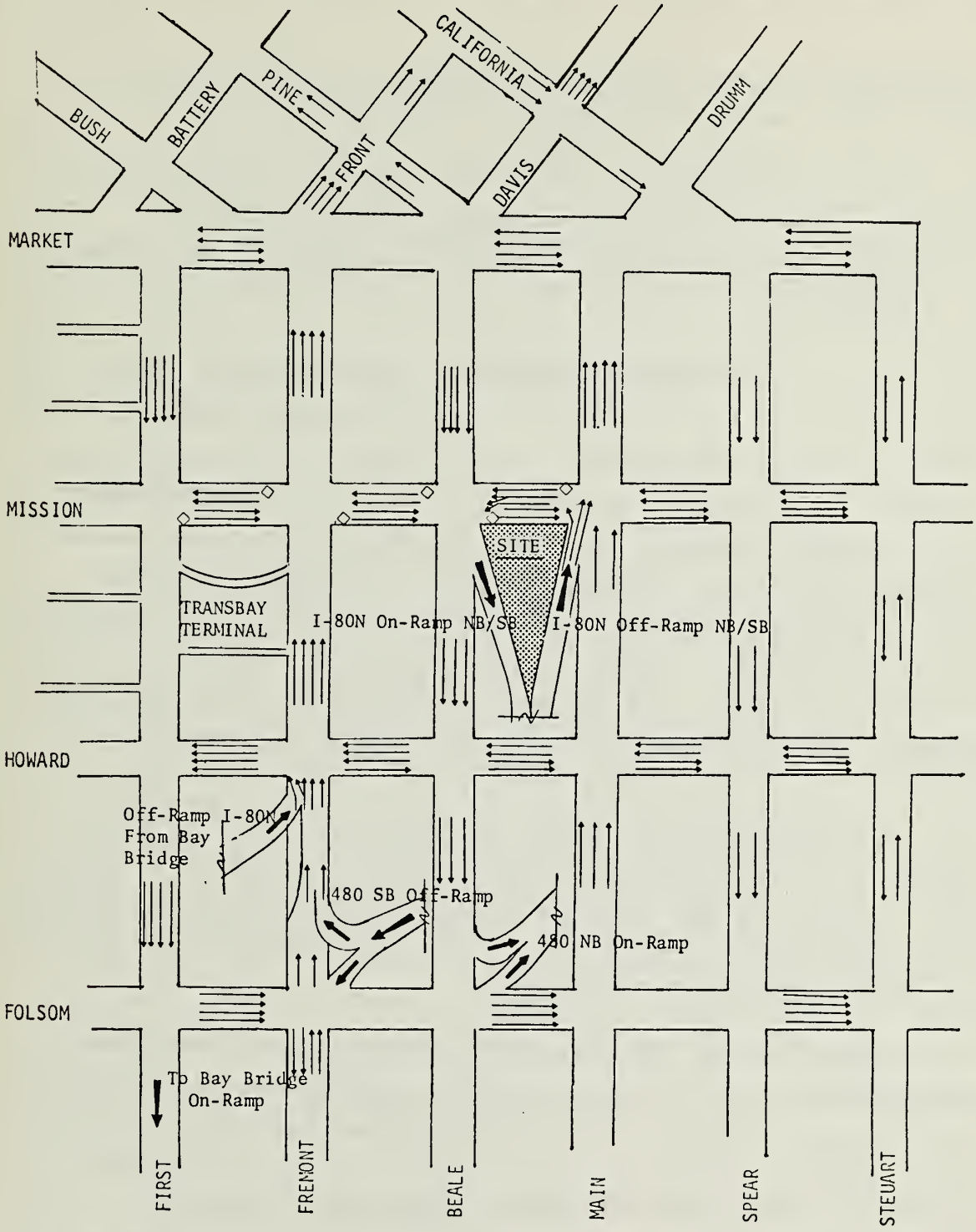
a. Street Network

The area is fed by several freeway on- and off-ramps. Off-ramps from I-80 are located on Fremont and Main Streets at Mission Street. On-ramps are located on Beale Street adjacent to the site. An additional on-ramp to the Bay Bridge is located at First and Harrison Streets. Off-ramps (southbound) and on-ramps (northbound) to The Embarcadero Freeway (Cal-480) are located on Fremont Street and on Beale Street (between Howard and Folsom) respectively. The locations of the freeway access points are shown in Figure 9 .

The Transportation Element of San Francisco's Comprehensive Plan designates Market, Howard, Folsom, Beale, Main and Spear Streets as major thoroughfares where major thoroughfare is defined as a "cross-town street whose primary function is to link districts within the City and to distribute traffic from and to the freeways; a route generally of citywide significance . . . ."

Market Street is a four-lane two-way street which has been classified as a Transit Preferential Street in the Transportation Element of the San Francisco Comprehensive Plan. Transit Preferential Streets are defined as "streets where priority is given to transit vehicles over autos . . . ." Left turns from Market Street are prohibited on many streets such as Beale Street, Main Street and Fremont Street. Market Street has a 55-foot roadway and 35-foot sidewalks on each side of the street. The south-of-Market streets in the area have standard sidewalk widths of 10-15 feet and pavement widths of 52-62 feet.

Mission Street is a two-way four lane street with the curb lanes reserved for buses and right turns from 7:00 a.m. to 6:00 p.m. The transit preferential diamond lane pair



Legend:

◇ Diamond Lane: Buses and Right Turns Only, 7am to 6pm
NB = Northbound
SB = Southbound
⟶ = Traffic Lane

Street Network

Not To Scale

N

FIGURE 9

extends west from Main Street. Parking is prohibited between 4:00 and 6:00 p.m. on both sides of the street.

Howard Street is an east-west four-lane street that varies from two-way to one-way between First Street and Steuart Street (see Figure 9, page 15). Folsom Street is four lanes (eastbound).

First and Fremont Streets are a one-way pair that straddle the Transbay Terminal. First Street is one-way southbound and is four lanes. First Street is designated as a Transit Preferential Street in the Transportation Element. It is used for access to the Transbay Terminal between Market and Howard Streets. Fremont Street is a one-way four-lane street northbound, except between Folsom and Harrison Streets, where it is two-way. Fremont Street is also a Transit Preferential Street. The Transbay Terminal has direct access to Fremont Street between Howard and Mission Streets.

Beale and Main Streets are a one-way pair, each is four lanes north of Mission Street and three lanes south of Mission Street. Beale Street runs one-way southbound and Main Street runs one-way northbound. Both are used during the peak hours for access to/from I-80.

Spear Street is a two-lane one-way street southbound. Steuart Street is a two-way two-lane street which is controlled by stop signs. Between Market and Mission Streets, Steuart Street has been designated as a Transit Preferential Street as 11-MUNI bus routes use the block on the east side of the street as a turnaround and layover area. California Street is a two-way Transit Preferential Street with a cable car line running along it. Front, Davis and Pine Streets are one-way streets with parking on both sides of the street. Parking is restricted during peak hours. Front Street provides connection to CAL-480.

Table 2 gives traffic counts for streets within the study area for four periods of the day (7:00-9:00 a.m., 10:00 a.m.-3:00 p.m., 4:00-6:00 p.m. and 7:00 p.m.-6:00 a.m.) and 24-hour counts. Peak-hour capacities for these streets are included. The data was obtained from the San Francisco Department of Public Works; not all streets have representative counts. Market Street has not been counted since 8 October 1964 due to the construction of BART and construction on Market Street within this area.

b. Mass Transit

The project site is located in an area that has multiple access to mass transit. The following transit services are provided within the study area: San Francisco Municipal Railway (MUNI) provides buses and trolley service within 0 to 2 blocks of the site; the Embarcadero BART station is located on Market Street between Main and Beale Streets; AC Transit (East Bay), SamTrans (Peninsula) and Golden Gate Transit (North Bay) are accessible at the Transbay Terminal (two blocks). Ferry service is available between the Ferry Terminal (4-5 blocks to the northeast) and Larkspur, Tiburon and Sausalito. Southern Pacific has train service to the Peninsula, approximately 8 blocks or 1.5 miles from the project. Feeder service is provided by MUNI between Southern Pacific and the site area by lines 80 and 27. SamTrans serves the Peninsula; it took over these routes from Greyhound in 1977.

There are 22 Municipal Railway bus routes and streetcar routes within 1-2 blocks of the site. Most of these routes follow either Market Street or Mission Street. All of the streetcar routes follow Market Street (Figure 10, page 19).

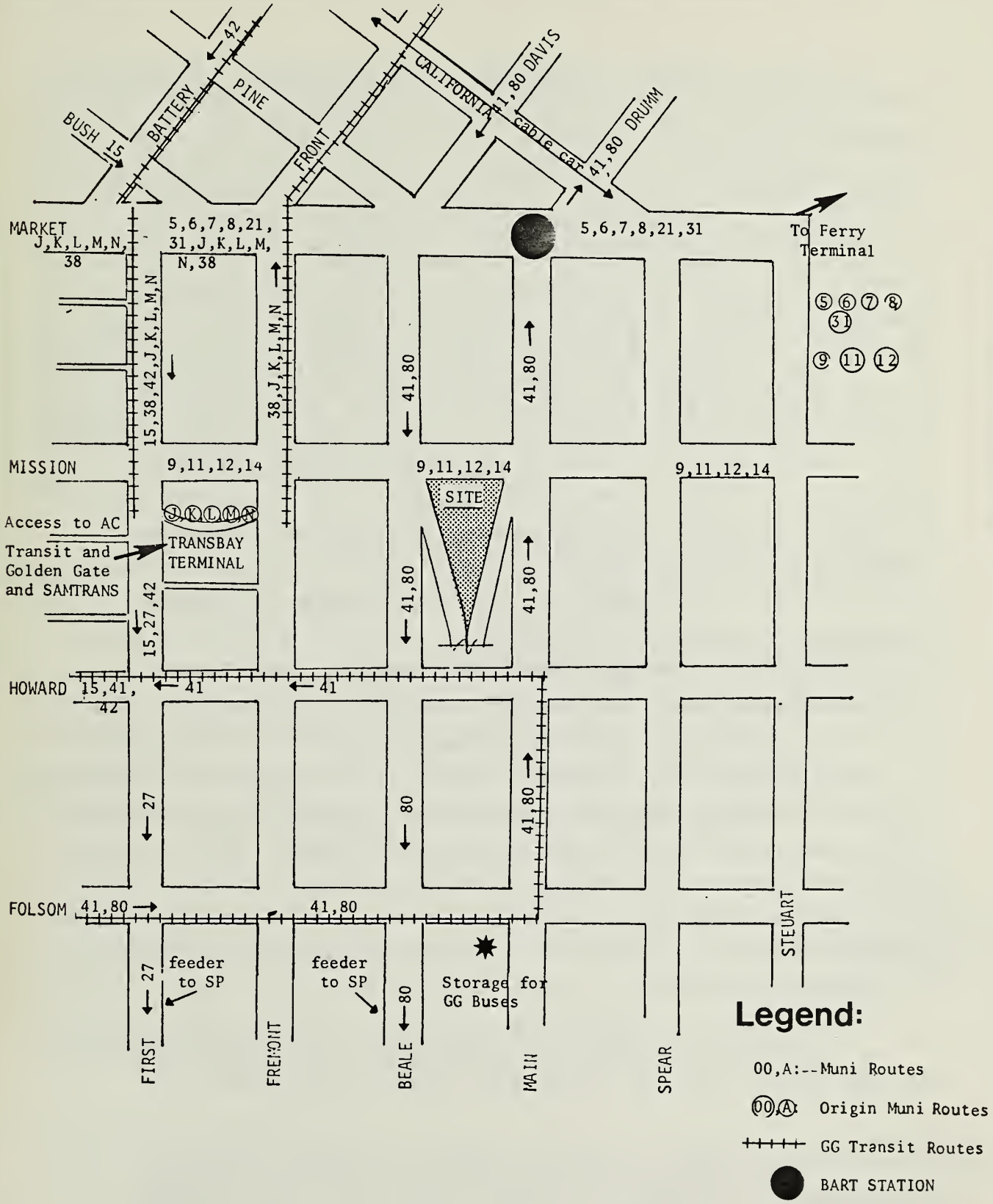
Table 2

TRAFFIC COUNTS[1] AND PEAK-HOUR CAPACITIES[2]

	7a.m.-9a.m.	10a.m.-3p.m.	4-6p.m.	7p.m.-6a.m.	24 hours	P.M. Peak 1-Hour Capacity
Main-So. Market 7/27/76	2,650	4,410	1,800	1,630	13,250	2,000
First-So. Market 2/27/76	1,620	3,460	2,130	1,890	11,610	2,000
Beale-So. Market 7/27/76	1,080	2,240	1,850	1,010	7,860	2,000
Fremont-So. Market 7/29/76	1,540	2,080	1,420	1,120	7,980	1,200
Mission-West of 4th 1/26/76						
eastbound	1,380	2,880	1,370	1,150	8,460	930
westbound	870	3,330	1,980	1,740	9,860	930
Howard						
west of 4th (1/17/77)	1,410	4,680	3,680	1,150	13,410	2,000
Folsom - West of 4th 1/27/76	3,050	4,690	2,140	980	13,600	2,000

[1] Obtained from San Francisco Department of Public Works.

[2] Assumes 10% turns, 10% commercial vehicles, 50% green time and a Level of Service 'C'. The 50% green time assumption represents average conditions in a Central Business District.



Transit Routes

FIGURE 10

The existing peak period (4:00-6:00 p.m.) volumes in the peak direction on trolley coaches and motor coaches is approximately 18,400 persons; the volume during the peak 30-minute period is 6,570 persons. There is space available (one-way) for approximately 20,290 seated passengers and 10,380 standing passengers. During the peak 30 minutes, lines 8, 9, 14 and 15 are at or exceed capacity assuming capacity is defined at approximately a 1.5 load factor. To a passenger the load factor provides an indication of opportunity to sit while riding, the passenger space on board and the possibility of being passed by a vehicle with a crush standing load. Load factors of 1.5 or greater for peak 15-minute intervals are considered above designated service standards.[1,2] It should also be noted that the capacities were estimated using MUNI published schedules and do not take into account missed trips. San Francisco Muni Transportation Project, Planning, Operations and Marketing, prepared by Wilbur Smith 1977, reported that the impact of missed trips on remaining scheduled service is to disrupt schedules and running times for trips immediately following the missed trip. This leads to a platooning or bunching of vehicles and increased passenger loads. To MUNI riders this results in longer waits, crowded buses, pass-by's and inconsistent travel times. Of the lines studied, missed trips ranged from 1.9 to 4.2%. This non-adherence to schedules was not taken into account in this analysis but it can reduce the available capacity of transit in the study area.

The Metro, a portion of the MUNI, which will operate in the upper level of the Market Street Subway near the

---

[1]S.F. Municipal Transportation Project, Planning, Operations and Marketing, Wilbur Smith and Assoc., Draft Final Report, June 1977.

[2]A load factor of 1.5 means all seats are taken and the aisle is full of half as many standees.

project, will include the five streetcar lines (J, K, L, M, and N). It is targeted to open in late 1979.[1] MUNI has estimated that there will be an increase in capacity of approximately 50% on the streetcars. However, because up to 10 minutes of travel time will be removed with the subway compared to surface buses, many persons now taking the bus will transfer to the Metro. The 50% increase assumes that the system will work as planned. Existing streetcar lines are nearing peak ridership in the peak 30 minutes. The N line is right at the capacity point. With the increase in capacity projected for MUNI Metro, load factors should be reduced to a more tolerable level.

There is independent jitney service that has a stop reserved for it from 7:00-9:00 a.m. on Mission Street across from the Transbay Terminal.

The project is one block from the BART Embarcadero station. BART operates from 6:00 a.m. to approximately 12:00 midnight, Monday through Saturday; Sunday service is available between 6 a.m. and 12 midnight. The Daly City/ Richmond line should begin full service operations in 1979 but this may be postponed because of the recent fire in the TransBay Tube.[2] Current ridership eastbound from the Embarcadero Station is approximately 16,000 during the peak period (4:00-6:00 p.m.).[3] Capacity during this period is 15,100 in one direction, assuming 10 cars per train and 13 trains per peak period on the Concord-Daly City line and an average of 8.5 cars per train and 10 trains per peak period on the Fremont/Daly City line and 70

---

[1]Peter Straus, MUNI Transit Planner, telephone conversation, 9 February 1979.

[2]Alice McDonald, MUNI Passenger Service, telephone conversation, 9 February 1979.

[3]BART Patronage Reports for February-May, 1978, prepared by BART Office of Research, Report Nos. 65, 66.

persons per car (seated only). The ridership of 16,000 represents an average load factor of 1.06 over the peak period. During the peak half-hour this average load factor is as much as 25% higher.[1]

Current ridership during the evening peak period (4-6 p.m.) westbound from the Civic Center Station, which is the maximum load point, is approximately 10,900 and capacity is 15,100 in one direction, which represents a load factor of 72%. During the peak 30 minutes this load factor could be as much as 25% greater.

The project site is within two blocks of the Golden Gate Transit Financial District Commuter Routes, which operate out of the Transbay Terminal, and the Golden Gate Transit Civic Center Commuter Routes, which operate along Folsom Street (inbound) and Howard Street (outbound). Service on these routes is available between 6:30 and 9:00 a.m. (inbound) and 4:00-6:15 p.m. (outbound). Four routes operate throughout the day out of the Transbay Terminal. Current patronage during the peak period (4:00-6:00 p.m.) on the commute system out of San Francisco is approximately 7,250 passengers on 19 routes. The average load factor is 0.86 with a peak load factor of 1.06 on route number 36 which serves Terra Linda in Marin County. Capacity of the system is approximately 8,400 seats during the peak period.[2]

The Sausalito and Larkspur Ferries carry approximately 1,000 passengers during the peak period (4-6 p.m.) in the

---

[1]Post AC Transit Strike Demand, estimates of peak period demands prepared by BART. Data provided by Thaddeus Usowicz, Capital Improvements Program Engineer, 28 June 1978.

[2]Alan Zahradnik, Senior Planner, Golden Gate Transit, based on April 1978 Monthly Summary Report (20 weekdays).

northbound direction. During the evening peak period three northbound trips are made supplying seating for 1,400 passengers.

AC Transit provides service between the East Bay and San Francisco at the Transbay Terminal at Mission and Fremont Streets. Service is provided throughout the day with special express service during the peak hours. During the peak period (4:00-6:00 p.m.) the Transbay ridership on AC Transit is approximately 12,600, which is at an average of 85 to 90% of available capacity during this period.

SamTrans provides service between the Peninsula and San Francisco at the Transbay Terminal. Service is provided throughout the day. During May 1978 it had a total ridership of 360,000 of which 139,000 of the trips had origins or destinations in San Francisco. This included direct trunk line service to BART.

During the peak period approximately 900 persons were outbound from the Transbay Terminal and capcity was approximately 1,640 seats during this period which produces a load factor of .56.

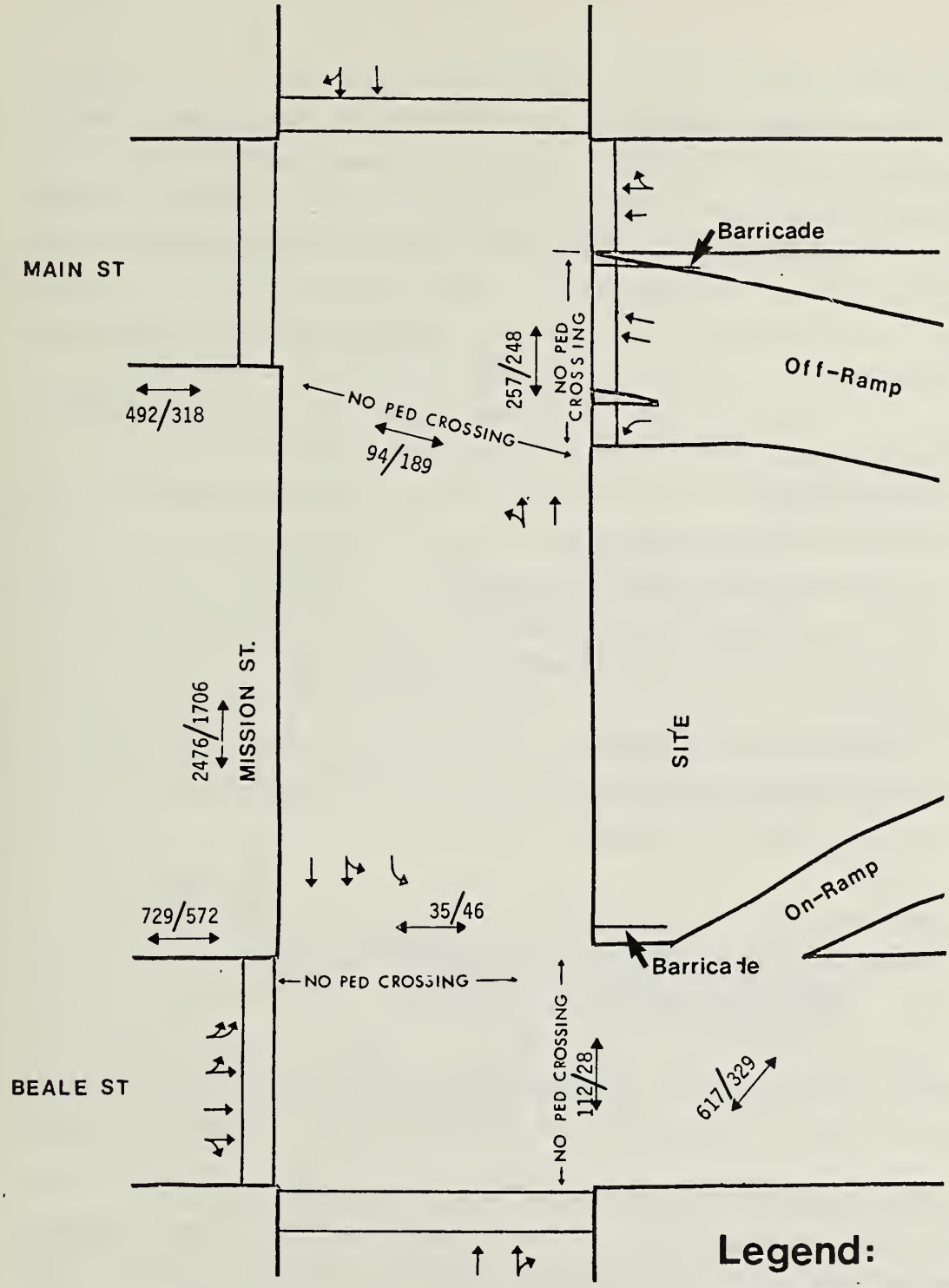
c. Pedestrians

Pedestrian levels vary throughout the study area and during different periods of the day. The pedestrian volumes increase from south to north within the project area and are heaviest during the noon hour and the morning and evening rush hours. The heaviest volumes are located along Mission and Market Streets and along those cross-street sidewalks between Mission and Market Streets.

Pedestrian access to the site is from the intersections along Howard Street. Pedestrian crossings to the project site are not allowed at the Mission/Beale Street and the Mission/Main Street intersections (Figure 11, page 25). However, pedestrians do cross at these locations, primarily to gain access to the parking lots located on the block.

There have been illegal pedestrian movements at the intersection of Beale and Mission Streets. To prevent interference of pedestrians with vehicles using the I-80 on-ramp, pedestrians have been prohibited from the south leg of Beale Street and the east leg of Mission Street (Figure 11). However, pedestrians do not appear to be complying with the regulation. A count was made on 23 September 1973 by the City Traffic Engineering Department between 4:00 and 5:30 p.m. at the Beale Street/Mission Street intersection. These counts were updated by Barton-Aschman Associates on 22 June 1978, and additional locations were counted. The results are shown in Figure 11. The total number of pedestrians crossing illegally during the evening peak period had not changed but the relative numbers on each leg had changed. There was one sign to indicate that these crossings were not allowed. The sign was on a barrier across the Mission Street sidewalk and was located in the southeast corner of the Beale and Mission Street intersection. It indicated that crossing Beale Street was not allowed and said "no ped crossing/use crosswalk". This was confusing as the arrow points across Mission Street where there was no crosswalk. According to the City Division of Traffic Engineering, the lack of a crosswalk and pedestrian signal heads indicate that no pedestrian crossing is allowed. As of 8 February 1979, this condition still exists.

Pedestrian acesss is also prohibited at the intersection of Main Street and Mission Street (Figure 11) across the west leg of Mission Street and across the I-80 off-ramp adjacent to Main Street. A crosswalk extended across the off-ramp, but there was a barrier between the off-ramp and Main Street that was meant to prohibit pedestrian crossings. Again, the lack of a pedestrian signal head and crosswalk across the Mission Street leg is meant to indicate that no pedestrian crossing is allowed.



Legend:

pedestrian counts (6/22/78)
00/00=11-1:30p.m./3:30-5:30p.m.

counts made by
BARTON-ASCHMAN ASSOCIATES, INC.

Pedestrian Access and Counts

Not To Scale

FIGURE 11

d. Parking

The proposed project is located in an area where there is on-street parking and off-street lots and garages which provide parking for the immediate area and the southern portion of the Financial District. An inventory of off- and on-street parking was made 13 January 1978. The boundaries of the inventory area were Folsom Street on the south, First Street on the west, Steuart Street on the east and Front Street and California Streets on the north. The following number of parking spaces were found:

Off-street	4,260 spaces
Meter-1-hour-towaway	17
Meter-1-hour-no restrictions	402
Meter-30 minutes-towaway	22
Meter-30 minutes-no restrictions	123
Free-1 hour	53
Free-no restrictions	67
Truck loading-general	188
Truck loading-special zone	18
White	28
Green	3
Red (excludes bus stops and curbs where no parking is allowed along the entire face)	40

Of the off-street spaces, approximately 80% are available to the public; that is, they can be rented by the hour, day or month.

From observations made during the inventory, most lots were 90-100% full, especially the cheaper all-day lots between Howard and Folsom Streets. Most on-street parking spaces were occupied (approximately 85-95%) and many vehicles appeared to be illegally parked in the loading zones, thus producing double parking by trucks. During the mid-day this produced some congestion but did not appear[1] to be causing any major problems.

[1]Observations made by Jean Follette, Barton Aschman Associates, Civil Engineer #27851.

It should be noted that these observations were made during the AC Transit strike so under non-strike conditions the lots would probably not be as full. Attendents were asked during the inventory if they were experiencing an increase in demand during the transit strike; in general responses were positive.

3. CLIMATE AND AIR QUALITY

a. Climate

A wind tunnel test of a model of the proposed project and surrounding buildings was conducted to determine the existing and future wind patterns and levels of comfort on the site (Appendix A, page 102). Tests were conducted for winds from the northwest and west, the prevailing directions in San Francisco. The investigation found that wind velocities in the project vincinity are generally low compared to other areas of San Francisco. The many high-rise buildings upwind of the site was cited as a dominant factor in the wind environment of the site.

b. Air Quality

San Francisco's persistent summer winds and its upwind position with respect to major pollutant sources continue to give it possibly the cleanest air in the Bay Area. Despite these advantages, there are periods, most often in fall and winter, when the air becomes stagnant. At these times the entire Bay Area has poor air quality.

The prevailing wind pattern in the Bay Area results in a deterioration of air quality east and south of San Francisco. Table 3 shows that, with the exception of nitrogen dioxide areas downwind of San Francisco have more severe air quality problems.

The main San Francisco air monitoring site is on the roof of the Bay Area Air Quality Management Control District's offices at 939 Ellis Street, located about 1-1/2 miles west of the project site. This location is not representative of

TABLE 3

Number of Days Selected Pollutants Exceeded State or Federal Standards, 1978[1]

Monitoring Site	Oxidant[2]	Nitrogen Dioxide	Carbon Monoxide	Suspended Particulates	Sulfur Dioxide
San Francisco (Ellis Street)	4	4	1	1	0
Redwood City	6	0	2	4	0
San Jose	40	0	23	7	0
San Rafael	13	0	1	1	0
Fremont	38	0	0	10	0
Livermore	35	0	0	9	0

Source: Bay Area Quality Management District, Air Pollution in the Bay Area by Station and Contaminent: 1978, March 1979.

[1]The State standards are specific concentrations and durations of air pollutants that reflect the relationship between concentration and undesirable effects. They are target values, and no timetable exists for their attainment. The Federal primary standards represent levels of air quality necessary for protection of public health, with an adequate margin of safety. The provisions of the Clean Air Act as amended require that by a specified date the Federal standards should not be exceeded more than once per year.

[2]In early 1979 the U.S. Environmental Protection Agency adopted a new oxidant standard. The previous standard of 0.08 parts per million for all oxidizing substances was replaced by a standard of 0.12 parts per million for ozone alone, the most prevalent oxidant. The table reflects the old standard. It is not known at this time if the new standard will be retroactive.

levels within downtown San Francisco, which is characterized by deep street canyons and congested traffic, two factors known to promote high levels of carbon monoxide.

While San Francisco's air quality is better than most locations in the Bay Area, Table 3 shows that the state and federal standards are not met in the Bay Area. This has resulted in the development of an Air Quality Maintenance Plan (AQMP) for the Bay Area, as part of the Environmental Management Plan (EMP) prepared by the Association of Bay Area Governments (ABAG) and other governmental agencies.

The AQMP contains a comprehensive strategy for the long term attainment and maintenance of the air quality standards. The Plan includes measures to reduce emissions from stationary sources and automobiles, and proposes land use and transportation measures designed to reduce automobile use. The air quality problems addressed in the AQMP are photochemical oxidants and suspended particulates. An investigation of carbon monoxide problems, which would include downtown San Francisco, is being planned.

The Draft AQMP was adopted by the ABAG General Assembly in June 1978, and has yet to be adopted or approved by the U.S. Environmental Protection Agency.

In February, 1979, the federal standard for oxidant was increased from 0.08 parts per million (all oxidants) to 0.12 parts per million for ozone only. This modification will have an effect on the AQMP, which is based on meeting the original standard.

4. NOISE (see Appendix E)

The Environmental Protection Element of the San Francisco Comprehensive Plan,[1] contains the 1974 noise levels along thoroughfares in San Francisco. The data are presented in terms of L_{dn}.[2] L_{dn}'s 50 feet from the centerline of streets bordering the site are shown below:

	L_{dn}
Mission Street	75
Beale Street on-ramp	75
Main Street off-ramp	70

To further quantify the existing noise environment, noise levels were measured by Charles M. Salter Associates at the following four locations near the corners of the proposed building:

No. 1: about 30 feet south of Mission Street and 75 feet east of the Beale Street on-ramp (at the northwest corner of the proposed building)

No. 2: about 35 feet east of the Beale Street on-ramp and 150 feet south of Mission Street (at the southwest corner of the proposed building)

No. 3: about 35 feet west of Main Street and 150 feet south of Mission Street (at the southeast corner of the proposed building)

---

[1]Transportation Noise Section, Environmental Protection Element of the Comprehensive Plan of San Francisco, San Francisco Department of City Planning, September 1974.

[2]The decibel (dB), as used in this report, is the unit of sound level referenced to the sound pressure corresponding to the threshold of hearing. The dBA (A-weighted decibel) accounts for the way the human ear responds to sounds of different frequencies. The L_{dn} (day-night equivalent sound level) is a 24-hour average with 10 dBA added to sound levels measured between 10 p.m. and 7 a.m. to account for people's heightened sensitivity to noise at night.

No. 4: about 30 feet south of Mission Street and 35 feet west of Main Street (at the northeast corner of the proposed building)

The noise measurement survey was conducted from 10:00 a.m. to 11:30 a.m., 15 June 1978.

Trucks climbing the Beale Street on-ramp were the loudest noise sources measured at location 2, reading 83dBA. Extrapolation of measurements at location 4 of Beale Street on-ramp trucks indicates truck noise levels would be about 85-86 dBA at location 2. Trucks and buses on Mission Street generated 72-75 dBA at locations 1 and 4, and 71 dBA at location 3. The average level (L_{50})[1] throughout the site was 62-65 dBA. The background level (L_{90}) measured ranged from 59-61 dBA.

Measurements were made with a Bruel and Kjaer 2219 Sound Level Meter fitted with a windscreen. During the survey the sky was clear, winds were less than 5 mph, and the temperature was about 60°F.

5. AESTHETICS

The project site is located in an urbanized area, surrounded on three sides by freeway ramps and bus ramps accessing the East Bay Terminal. The site is visible from ground level from across Mission Street to the North; views from other directions are blocked by the freeway ramps.

The site is visible from windows of highrises on the north side on Mission Street and lower buildings along Main Street and Beale Street. Views are of parked cars on the asphalt surface, partially screened by the few trees located

---

[1]The L_{50} and L_{90} represent the A-weighted sound levels exceeded 50%, and 90% of the measurement period, respectively.

on the northwest and northeast corners of the site (see Figure 2, page 3). A billboard at the north side of the parcel is conspicuous.

6. VEGETATION AND WILDLIFE

Vegetation on the site consists of six 15-20 foot treets located at the northwest and northeast corners of the site. These trees may be occasionally used for roosting by birds.

There are no known endangered plant[1] or animal species on the site.

7. ENERGY CONSUMPTION

Use of power on the site is limited to lighting and domestic uses within the trailer on the site for the parking lot attendant.

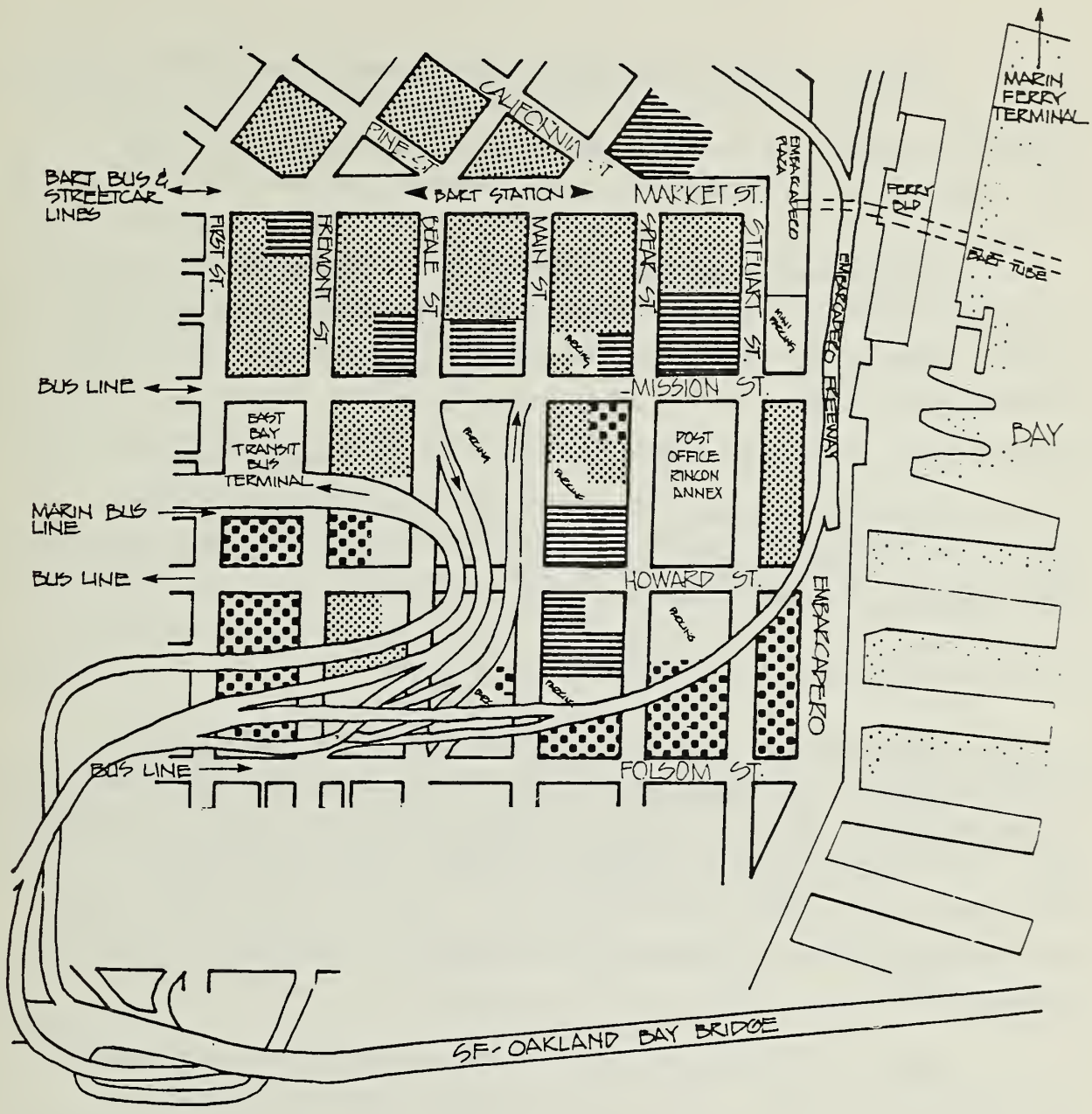
8. LAND USE

Land uses near the project site consist of pre-1930 two to three-story commercial/office buildings and new (built since 1970) highrise structures (see Figure 12). The area is urban, with vegetation limited to street trees and landscaped plazas associated with highrise offices.

Directly across Main Street, the north half of the block is occupied by two-story brick buildings housing a restaurant, print shop, antique store and offices. The south part of this block is the construction site for the Howard and Main Office Building (see EE 74.140).

---

[1]San Francisco Department of City Planning, Endangered Plant Locations in San Francisco.



LEGEND:

NEW COMMERCIAL*

MIXED COMMERCIAL

INDUSTRIAL

* POST 1960

Local Land Use and Access

Not To Scale

N

FIGURE 12

Directly across Mission Street, the 33-story P.G. & E. Building occupies the entire block. West of this building is the Bechtel Complex, with several highrise buildings (see EE 74.224).

Across Beale Street, the block is occupied by a five-story office building with some commercial uses on the ground floor. The southern portion of this block is a long-term parking lot.

South of the site is a parking lot across Howard Street, underneath the freeway overpass. There are three post-1970 highrises on the block south of Howard and east of Main Street, ranging from 8 to 17 stories.

9. HISTORICAL AND ARCHEOLOGICAL RESOURCES

The project site was part of Yerba Buena Cove, an inlet used for anchorage of ships during the 18th and early 19th century. Around 1850, the area was being rapidly filled and industrial enterprises constructed. As the filling continued, the site became part of a land-locked lagoon known as the Tar Flats, a name derived from the discharge of a nearby gas works.

The site was eventually filled completely and became an industrial area. The 1906 earthquake destroyed all buildings on the site, and between 1906 and 1912 the area was rebuilt. All buildings were removed in the 1960's with the construction of the freeway ramps.

The project site's history indicates the potential for a variety of historic and archeological artifacts: marine artifacts, bottles, tools, and miscellaneous materials from the basements of previous buildings. Early photographs and lithographs of the project area indicate that at one time a goldrush-era ship was land-locked within Tar Flat Lagoon and

could possibly have been on the project site.

The construction of post-earthquake buildings on the project site involved basements which required removal of fill material. This could have removed or destroyed existing artifacts (see Appendix F). These buildings were generally built on piles driven through the fill material and extending 85 to 90 feet downward. An analysis of building permits for the site has shown that approximately 1,630 wooden piles were driven into the site for post-earthquake buildings (see Appendix F).

The construction of the freeway ramps also involved excavation to depths of 4 to 6 feet for construction of retaining walls and pile caps. The freeway ramps are supported on irregular patterns of piles, having a spacing of from 4 to 12 feet.

Construction of the Key System required the installation of pile-supported concrete columns. Twenty-four of these columns are located within state property adjacent the property site near the Howard Street/Beale Street intersection.

The excavation and use of piles would have probably destroyed any large buried objects on the site, such as a ship hulk.

10. ECONOMIC ENVIRONMENT

a. Tax Generation

The existing land uses on Assessor's Block 3718, lot 26 have a total declared assessed valuation of $518,340.[1] At the present San Francisco tax rate of $5.06 per $100 of assessed valuation, the property generates $26,000 in property taxes annually.

b. Demand for Office Space in Downtown San Francisco

San Francisco is one of the nation's leading office centers. A number of interrelated factors have contributed to the expansion of office space in the City since World War II: (1) growth in the national economy; (2) San Francisco's central location in the Bay Area, its ability to serve markets in the western states, and its status as an international trade center; (3) the changing composition of the work force, with expansion of professional services and employment in finance, insurance and real estate; (4) the status factor of a San Francisco address for business organizations; (5) the high quality of residential areas within commuting distance of the downtown core; (6) the reduced availability of close-in competitive sites; (7) the development of rapid transit connecting the downtown core to outlying residential areas; and (8) the perceived necessity of replacing older office stock with larger, more modern structures.

Most of the new office space in San Francisco has been constructed in the downtown. Table 4 shows the amounts of major office space constructed in the downtown since World War

According to data supplied to the San Francisco Department of City Planning, 10,850,000 sq. ft. of major office space are under construction or are proposed to be built in the 1979-1981 period, with an annual growth in excess of 3.6 million sq. ft.

---

[1]Mr. James Moolring, Senior Property Appraiser, State Board of Equalization; phone conversation 5 June 1978.

Table 4

Downtown San Francisco
Major Office Building Construction*, **

	Sq. Ft. Constructed	Average Annual Growth Rate in Sq. Ft.
1945-1975	23,800,000	770,000
1960-1975	20,800,000	1,300,000
1970-1975	10,500,000	1,800,000
1975-1978	3,600,000	900,000

*San Francisco Department of City Planning, Commercial Trends: Report Containing Background Information for the Commerce and Industry Element of the Comprehensive Plan of the City of San Francisco, July 1975.

**Keyser Marston Associates, Inc., 16 June 1978.

Presently, the San Francisco office market is exhibiting renewed strength. With no major projects scheduled for completion in 1978, and two scheduled for 1979, office space is in short supply in the downtown. Surveys by the San Francisco Building Owners and Managers Association (BOMA) indicate a 4% vacancy factor in office space city-wide as of October 1977, and an estimated present vacancy factor of 3%.[1] The BOMA surveys also indicate little availability of space in the downtown's pre-1955 office buildings, with an overall vacancy factor of less than 9% for all buildings surveyed.

The Department of City Planning, in a background report to the San Francisco Comprehensive Plan, stated that " . . . barring any long-term economic downturn, future demand for new office space will be strong in San Francisco."[2]

[1]Scott Stephens, Staff Assistant, San Francisco Building Owners and Managers Association, phone conversation, 24 May 1978.

[2]San Francisco Department of City Planning, Commercial Trends: Report Containing Background Information for the Commerce and Industry Element of the Comprehensive Plan of the City and County of San Francisco, July 1975.

c. Development South of Market Street

The finance and administration district has been expanding to the east and south, with new development filling up the open land along The Embarcadero and areas south of Market Street. The shift away from the traditional core is apparently due to the scarcity of developable sites in the center of the office district and improved access via BART to other locations in the downtown. Major proposed office projects south of Market are shown in Table 5.

Table 5

Proposed Office Building Projects in the South of Market Area*

Project/Location	Estimated Compl. Date	No. Stories	Net Rentable
Marathon Reality 595 Market Street	1979	31	350,000 - 400,000 sq.ft.
Metropolitan/Bechtel 333 Market Street	1980	32	600,000 sq.ft.
Federal Reserve Bank Market/Mission/Spear/ Main	1982 or later	N/A	N/A
Borel Building 180 Howard Street	1979	13	200,000 sq.ft.
Yerba Buena Convention Center	1990	N/A	2,800,000 to 5,880,000 sq. ft.

*Information compiled by Keyser Marston Associates.

III. LOCAL AND REGIONAL ENVIRONMENTAL IMPACTS

1. GEOLOGY, SOILS, SEISMICITY AND HYDROLOGY

The building loads would result in settlement in the soils beneath the building. The total settlement would be expected to be a maximum of 3.5 inches, with a maximum differential settlement of 2.0 inches.[1] About 20% of this settlement would occur during construction; the remainder would occur over a period of several years.

The excavation would contain water that would seep in from the sides of the excavation and from rainfall. Sheet piling used to form the excavation walls would restrict seepage. Seepage, if uncontrolled, could lower the groundwater level in adjacent areas and cause settlement of roadways or structures. After completion of the sheet piling, the excavation would be de-watered. Occasional de-watering would also be needed to remove any seepage and rainfall for a period of six months. Water would be removed from the site with sumps and pumps, and discharged into the street run-off collection system.

2. TRAFFIC, TRANSPORTATION, CIRCULATION AND PARKING

Prior to evaluating the impacts of the proposed project the incremental traffic impacts expected to be produced by other proposed projects in the area must be added to existing conditions. Two projects that have been proposed can be taken into account

---

[1] Harding-Lawson Associates, Foundation Investigation Pacific Gateway Office Building, HLA Report, No. 3343,022.04, 1978. A copy is available at the Office of Environmental Review.

in this study as EIR's have been completed on them. Located at 333 Market[1] and 444 Market,[2] both are now under construction.

The project at 333 Market consists of two new highrise office buildings, a satellite building, a parking garage and a landscaped plaza. The total new space will include 545,000 square feet of occupied space in one highrise, 535,000 square feet in the other highrise and 47,600 square feet in the satellite building.

The proposed 444 Market Street project would consist of a 38-story office tower and a two-story retail structure totalling 768,000 square feet (gross). Three of the four existing retail-office buildings on this site would be razed.

Other projects that have been proposed within the study area, but which have not been fully studied, are the new Transbay Terminal and the Federal Reserve building on the block surrounded by Mission, Market, Main and Spear Streets. The Rincon Annex Post Office on Mission Street, between Spear and Steuart Streets, may be abandoned.

a. Trip Generation and Distribution

Trip generation rates were obtained from the City of San Francisco Planning Department. A rate of 17.5 trips per 1,000 square feet of leasable area was obtained for office type uses and 200 trips per 1,000 square feet[3] of leasable area was obtained for the bank/retail area. It will be assumed that approximately 25% of the bank/retail trips are internal

---

[1]San Francisco Department of City Planning, Draft Environmental Impact Report Amendment, Proposed 333 Market Street Buildings, San Francisco, California, 9 September 1977, EE 77.98.

[2]San Francisco Department of City Planning, Final Environmental Impact Report, 444 Market Street, San Francisco, California EE 74.253, 1975.

[3]Gail Bloom, Department of City Planning, 20 May 1978.

to the building. The number of home-to-work trips is 2 per employee and it was assumed that there was 200 square feet per employee.

Trips generated by the project have origins in four areas of the Bay Area: (1) San Francisco, (2) North Bay (Marin County, Sonoma County), (3) East Bay, and (4) the Peninsula (San Mateo County and Santa Clara County). An employee survey was taken in the One Market Plaza Building and approximately a 12% sample was taken. The results of this survey are shown in Table 6. Table 7 shows the breakdown of all other non-work trips.[1]

The project would generate 11,400 trips over a weekday and 2,600 trips during the peak-hour. Table 8 shows the peak-hour (4:30-5:30 p.m.) trip generation by mode and origin.

Approximately 60% of these trips (1,500 trips) would be by transit during the peak-hour. The 850 trips going by automobile would result in 610 vehicle trips during the peak-hour, assuming a 1.4 person/vehicle occupancy rate.

b. Traffic and Circulation

Non-transit vehicle trips generated by the project are estimated to be 610 vehicle trips during the peak-hour and 3,000 vehicle trips over the entire day. Because there is less on-site parking than demand generated by the proposed project, the impact of most of the 3,000 vehicles trips would be dispersed throughout the study area. As the existing parking lots within the study are approximately 90-95% full (according to attendants and observations), it may be necessary to park outside the study area, which would further disperse trips and reduce impacts on the adjacent streets, but total vehicle circulation would probably increase because persons would be searching for parking spaces.

---

[1]Source: EE 74.253, Table A4, p. A-17.

Table 6

TRIP DISTRIBUTION AND MODAL SPLIT OF EMPLOYEE WORK TRIPS[1]

	Origin		Modal Split (%)											
			Auto		Bus		BART		Ferry		SPRR		Walk	
	%	Trips	%	Trips	%	Trips	%	Trips	%	Trips	%	Trips	%	Trips
San Francisco	30	1,715	15	255	66	1,140	10	170	--	--	--	--	9	150
Peninsula	17	970	39	380	11	110	16	150	--	--	34	330	--	--
East Bay	40	2,290	29	665	40	915	31	710	--	--	--	--	--	--
North Bay	13	745	26	195	57	420	--	--	17	130	--	--	--	--
	100%	5,720		1,495		2,585		1,030		130		330		150

[1]Survey conducted over the week of June 20, 1978 by Barton-Aschman Associates at One Market Plaza to establish distribution and mode split. DelMonte Corporation (approximately 1,350 employees) and Brobeck, Phleger and Harrison, a law firm (approximately 300 employees) were surveyed. The office complex contains approximately 1,400,000 square feet of which approximately 85 percent was leased at the time of the survey. Assuming 135 square feet per employee (according to Mr. Conahan, building manager) there are 8,700 employees in the complex. The survey was given to approximately 19 percent of the employees in the complex. Of the 1,650 surveys handed out, 1,040 surveys were returned and usable which represents a return rate of 63%. Also, approximately a 12% sample was obtained.

Table 7

TRIP DISTRIBUTION AND MODAL SPLIT OF NON WORK TRIPS

	Origin		Modal Split					
			Auto		Transit		Walk	
	%	Trips	%	Trips	%	Trips	%	Trips
San Francisco CBD	44	2,490	30	745	30	745	40	1,000
San Francisco	40	2,265	50	1,135	40	905	10	225
Peninsula	7	395	80	315	70	80	--	--
East Bay	7	395	85	335	15	60	--	--
North Bay	2	115	75	85	25	30	--	--
		5,660		2,615		1,820		1,225

Source: Final EIR for 444 Market Street, EE74.253, Table A4, pg A-17.

Table 8

PROJECT TRIP GENERATION - PEAK HOUR[1] - 4:30-5:30 (PERSON TRIPS)

	Total Work[2]/ Non-Work[3]	Auto Work/ Non-Work	Bus Work/ Non-Work	BART Work/ Non-Work	Ferry Work/ Non-Work	SPRR Work/ Non-Work	Walk Work/ Non-Work
San Francisco	515/715	80/285	340/215	50/35	--	--	45/180
Peninsula	290/60	115/50	30/0	45/5	--	100/5	--
East Bay	690/60	200/50	275/5	215/5	--	--	--
North Bay	225/15	60/10	125/5	--	40/0	--	--
Sub Total	1,720/850	445/395	770/225	310/45	40/0	100/5	45/180
TOTAL	2,570	850	995	355	40	105	225

Assuming auto occupancy = 1.4 persons per vehicle =

San Francisco	-	260
Peninsula	-	120
East Bay	-	180
North Bay	-	50
TOTAL		610 vehicle trips

Assumptions:

[1]30% of all work trips occur in the pm peak-hour (50% in pm peak period) and 15% of non-work trips occur in the peak-hour.

[2]home-based work trip, 2 trips per employee

[3]business, service, shopping trips, 7.5 trips per 1,000 sq. ft. for office and 200 trips per 1,000 sq. ft. for retail.

Access to the project parking lot would be from Howard Street. Howard Street is four lanes with two lanes in each direction between Main Street and Beale Street. As access to the existing parking lot would be from Howard Street and as there would be a net reduction of 14 parking spaces, the result would be to reduce the number of vehicles desiring access from Howard Street into the lot during the morning and evening peak periods. During the day, service vehicles would use this driveway for deliveries. As Howard Street is two-way in this block, the number of left turns could be reduced, thus reducing delay to through traffic on Howard Street. The driveway into the parking area would be approximately 150 feet long, which would provide enough storage space during the A.M. peak-hour to prevent backups onto Howard Street. Sidewalks would be provided along the driveway for pedestrians.

The greatest impacts of the vehicle trips generated by the project would be on the on-ramps to I-80 during the evening peak-hour. In October 1976, counts were taken at the Beale Street on-ramp and were found to average, over three days, 830 vehicles westbound and 1,860 eastbound. Depending upon where vehicles are parked, the westbound ramp could have an increase in demand of up to 90 vehicles (10%) and the eastbound ramp could experience an increase of up to 120 vehicles (6%). If the freeway and ramps cannot accept these additional vehicles, they would backup onto Mission Street and Beale Street. The freeway is currently operating at a Level of Service 'F'[1] and any additional traffic added to the flows would increase delay and extend the peak period later into the evening.

---

[1]Level of Service 'F' describes forced flow operations at low speeds where volumes are below capacity. These conditions usually result from queues of vehicles backing up from a restriction downstream. Speeds are reduced substantially and stoppages may occur for short or long periods of time because of downstream congestion. (Highway Capacity 1965, Highway Research Board Special Report 87, p. 81)

c. Transit

The proposed project is projected to generate 1,500 - 1,700 transit trips during the p.m. peak hour (140 in and 1,360 out). Many of these transit trips would be on MUNI transit facilities but other Bay Area transit would also be used. Table 9 shows existing traffic volumes, capacities and projected loadings for the transit agencies serving the project.

MUNI

The total increase in MUNI ridership during the peak hour due to the proposed project and the two Market Street projects would be 1,610 trips outbound of which 440 would be generated by the proposed project. The total future volumes on the MUNI lines in the vicinity of the project would be 15,530 trips outbound. The capacity in this location would be 13,805 seats outbound which would result in an overall load factor of 1.1. But, taking into account that some lines are at crush loading conditions now, many routes would experience load factors greater than 1.5 ("crush load"). The probable effect of increased loads, especially on routes that are now at or near crush loading conditions, would be to extend the peak period and decrease operating speeds because more time would be required for loading and unloading. It is unlikely that the increased loadings during the peak period would produce major mode shifts as the only alternative to transit is the automobile (the bicycle and walking are the other alternatives but are not alternatives that large numbers of people would use). Current parking policy is decreasing the parking supply in the area and increasing parking charges create a major disincentive to driving. The Metro should relieve the crush loading conditions to a certain degree, but with all of the new construction occurring within the C-3-0 District (Financial District) demand for MUNI should increase and eventually offset any capacity increases associated with the Metro.

Table 9

FUTURE PM PEAK-HOUR TRANSIT VOLUMES (OUTBOUND)

	Transit Agency								
		BART							
Project	MUNI	West Bay	East Bay	AC	GG	Ferry	Sam Trans	SPPR	TOTAL
333 Market	550	160	280	350	165	50	65	135	1,775
444 Market	620	190	45	60	25	5	10	30	965
Gateway	440	125	220	275	130	40	50	105	1,385
Total New Trips	1,610	475	545	685	320	95	125	270	4,125
Existing Volumes	13,920	10,900	8,650[1]	6,800[1]	3,900[1]	540[1]	500[1]	4,600	49,820
Future Volumes	15,530	11,375	9,195	7,485	4,220	635	625	4,870	53,945
Capacity[4]	13,805	15,100	7,550[2]	5650[2]	4,200[2]	700[2]	820	6,000[3]	61,390

[1]Peak-hour assumed 54% peak period.

[2]Peak-hour assumed 50% peak period.

[3]9-10 cars/train, with 100-150 seats per car.

[4]Total available seats.

Other Transit Services

The impact on other transit services would be similar. AC Transit, Golden Gate and BART all experience peak loads during the evening peak period. BART is now operating under certain constraints that would not allow reduction in headways. Therefore, the peak would spread out if severe load factors were experienced or a change in mode would occur. AC Transit and Golden Gate Transit would experience crush loads on some lines. The Ferries, SP and SamTrans could accommodate the expected increases in demand associated with the proposed project. Overloading any of these systems could create a change in mode but, as with MUNI, the parking supply is becoming a constraining factor on auto use within the study area and the Financial District. It is unlikely that in the long run a major mode shift to the auto would occur.

If transit cannot service demand generated by the extensive development occurring in the Project area and Financial District, businesses may find it more attractive to locate in other parts of the Bay Area that would be more accessible to employees. Any increases in capacity on the transit lines serving the project would require increased expenditures for equipment and operating costs. The funds used to cover the increased costs would come from the yearly budgets of transit agency. Increased revenues would also be associated with the increased demand but would not cover the costs.

e. Pedestrians

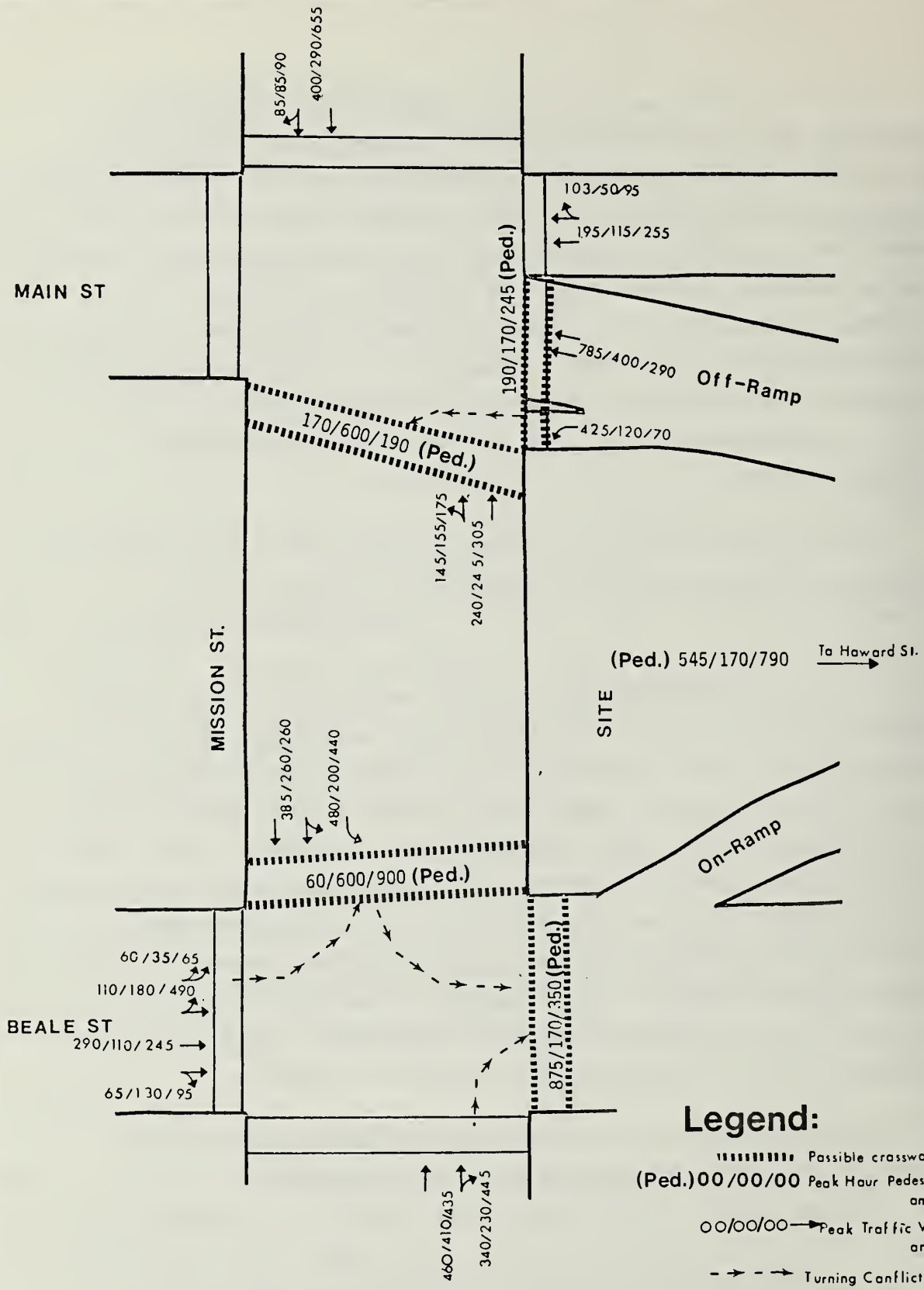
It is estimated that there would be 11,400 person-trips made to/from the site. They all have some degree of walking included in the trip. These trips could have either of the following purposes:

(1) travel to/from transit lines or vehicles, and
(2) employee and visitor travel to other offices, shops or restaurants.

Of the 11,400 person-trips made during the day, approximately 20% would occur in the evening peak-hour and 15% during the two other peak-hours, representing 2,480 trips during the evening peak-hour and 1,710 trips during the noon and a.m. peak hours. The office building would be oriented so that there would be entrances at the front (on Mission Street) and the back (to the parking area). Pedestrian crossings across Mission Street at Main Street and Beale Street is not currently allowed. A discussion of providing crosswalks at those streets where pedestrian crossings are now prohibited is included under project alternatives.

During the morning and evening peak hours the direction of approach of pedestrians is a function of their mode of arrival and departure. MUNI riders would walk along Mission Street from bus stops and from the Transbay Terminal. East Bay, North Bay and the Peninsula bus riders would arrive and depart from the Transbay Terminal and would also be using Mission Street as access to the project. This would represent approximately 45% of all trips to/from the project. BART riders would approach from the north down Beale or Main Streets. Auto trips would generally be destined for parking lots south of the project as this is the location of cheaper and more plentiful parking. Pedestrian trips associated with these trips would come in from the Howard Street access. Those persons parking north of the project would use the Mission Street entrance. Figure 13 shows the estimated flow of pedestrians to/from the project.

During the noon hour, most of the trips would have destinations north of the project as more restaurants are located in this area and most noon time activity is related to eating. Assuming that 90% of the trips made during the noon hour would use Mission Street and 10% would exit onto Howard Street, Mission Street in front of the office would experience an increase in pedestrian levels of 1,540 two-way trips over approximately 10-20 existing trips along Mission Street during the noon hour.



Traffic, Pedestrian Volumes

Not To Scale

FIGURE 13

New crosswalks can be considered at four locations: (1) the south leg of Beale Street, (2) the east leg of Mission Street, (3) the west leg of Mission, and (4) the south leg of Main Street. Each of these crosswalks would affect the operations of its respective intersections to varying degrees depending upon the extent to which the crosswalks conflict with turning movements. The conflicts, turning volumes and projected site generated pedestrian volumes, are shown in Figure 13.

f. Service Vehicles

Service vehicles would include light, medium and heavy[1] trucks. The proposed office building would have 3 truck loading docks in its parking lot. Trucks would access these docks from Howard Street. Turnaround area has been provided in the design of the parking lot so that trucks may both drive in and drive out, except for those trucks delivering oil to the project. No loading would be allowed from Mission Street.

In the case of natural gas shut-off, as a result of shortage, the proposed office building would be heated by oil; deliveries of oil would occur approximately every five days. Due to the amount of oil to be delivered, trucks with two trailers would be required. Because of their size, these trucks would not be able to maneuver within the planned parking lot. Discussions with the Department of Public Works, Bureau of Traffic Engineering indicate that oil deliveries could be made from Mission Street without causing traffic problems, if they were scheduled to occur in the evening after the rush hour period is over. The trucks would not interfere with traffic at this time nor with the transit diamond lane in effect between 7:00 a.m. and 6:00 p.m. Traffic volumes are light west bound on Mission after rush hour.

---

[1]Light trucks are pickups and vans; medium trucks are panel trucks and heavy trucks are truck/trailer combinations.

g. Parking

There would be a net reduction parking of 24 spaces on site. The result of reducing available parking would be to disperse trips that are now destined for the parking lot to other lots within the area. Due to the high usage (90-100% occupied) of nearby lots and the City's policy of making a long-term parking belt south of Folsom Street, trips may be diverted to lots south of the site. It should be noted here that the provision of any long-term parking within the C-3-0 zoning is contrary to San Francisco's Master Plan Policy; this policy is not currently reflected in the Planning Code.

Parking demand generated by the project would primarily be long-term. It is estimated that the office building would generate a demand for 610 parking spaces.

3. CLIMATE AND AIR QUALITY

a. Climate

A wind tunnel study of the proposed project found that the construction of the project would not cause wind related problems, primarily because the site is sheltered by the bulk of the downtown high-rises (see Appendix A, p. 102).[1] Shadows from the building would make the pedestrian areas east of the site less comfortable, while the plaza area at the Beale-Mission intersection would be comfortable because it would not be shadowed and the tree planting would reduce winds.

b. Air Quality

The project would affect air quality through generation of automobile traffic electrical power use and on-site fuel combustion for space and water heating.

(1) Effects of Auto Traffic

Automobiles approaching and leaving the project would affect traffic volumes on streets both near the project and on the major freeway systems in the region. For this reason, automobile emission impacts have been assessed on both the local and regional scale.

(a) Local Scale Impacts. On the local scale, the pollutant of greatest importance is carbon monoxide. In San Francisco, high carbon monoxide concentrations are associated with high traffic volumes and congestion occurring the street canyons of the city. A traffic impact analysis for the project has been performed, and it was found the greatest congestion and highest traffic volumes in the vicinity of the project occur at the Beale Street/Mission Street intersection. This intersection is also the focus of the project's impact, as most automobiles coming to the project from the East Bay and Peninsula would use the freeway offramp at this intersection. Because the parking provided on-site would be less than demand, the majority of the trips generated by the project would end at parking areas south of Mission Street.

In the evening, the impact of the project's traffic would be spread over a large area because of the numerous locations of trip origin and because there are several other freeway access points for traffic going to the East Bay and Peninsula that are more accessible to parking lots south of the project site than the freeway onramp adjacent to the proposed project.

An analysis of existing and future carbon monoxide (CO) levels at the Mission/Beale intersection has been prepared, and the results are shown in Table 10. The analysis has been

---

[1]Wind tunnel measurements are estimated to be within ±10% of the actual wind.

carried out for the peak 1- and 8-hour traffic periods, corresponding to the averaging times in the federal ambient air quality standards for CO; the impacts of the proposed project and of other approved highrise office buildings now under construction are included. Worst-case meteorological conditions were assumed, and the calculations were made according to the methodology of the Bay Area Air Quality Management District.[1] Meteorological and traffic assumptions and prediction methodology are described in Appendix C.

Table 10
Estimated Maximum Carbon Monoxide Concentrations
at the Mission/Beale Intersection

	Concentration, in PPM	
	1-hour	8-hour
Existing (1977)	7.0	2.1
1980 with other approved highrises[2]	6.4	2.0
1908 with project	6.8	2.1
Federal standards	35.0	9.0

The federal ambient air quality standards for CO are 35 and 9 parts per million for the one- and eight-hour averaging times. The background level is 3-4 parts per million. The combination of background, project emissions, and emissions from other new projects would result in concentrations that are 20% of the 1-hour standard and 23% of the 8-hour standard. The reduction in concentrations between 1977 and 1980 is due to anticipated improvement in and enforcement of emission controls on automobiles.

[1] Bay Area Air Quality Management District, Guidelines for the Air Quality Impact Analysis of Projects, June 1975.

[2] 333 Market Street EE77.98 and 444 Market Street EE 74.253.

The impact of the project on local CO levels would be an increase of about 5% over levels without the proposed project. This is primarily due to the fact that, because on-site parking is limited, trips to parking areas would be spread out over a radius of perhaps 3 blocks and impacts on individual streets would not be measurable.

A recent study conducted for the Yerba Buena Center[1] showed that the traffic generated by that large project would result in an increased frequency of violations of the 8-hour CO standard in the vicinity of the Center. The Yerba Buena Center is located about six blocks west of the Pacific Gateway Project. Implementation of the Yerba Buena project would probably increase background CO levels near the Pacific Gateway site.

The analysis done for the proposed Yerba Buena Center shows that large scale development could result in violation of the CO standards. Thus, continued development of the south of Market area near the project could result in future standards violations.

(b) Regional Impacts. The regional impacts of the project would be related to the regional increase in Vehicle Miles Travelled (VMT) generated by the project. Based on the project traffic engineers' estimate of the probable origin of vehicle trips to the project,[1] the daily VMT increase has been estimated at 12,300. Assuming an average route speed of 25 mph, the increase in the regional pollutant burden has been estimated and is shown in Table 11.

---

[1]San Francisco City Planning Commission and San Francisco Redevelopment Agency, Draft Environmental Impact Report, Yerba Buena Center, January, 1978.

Table 11

Regional Automobile Emissions

(see Appendix C)

Pollutant	Project Auto Emissions (tons/day)	Regional Emissions (1980) (tons/day)
Carbon Monoxide	0.25	2,500
Hydrocarbons	0.03	950
Oxides of Nitrogen	0.04	750

The above increase in regional emissions would result in a degradation of regional air quality. Of particular importance are the increases in hydrocarbons and oxides of nitrogen which result in the formation of photochemical oxidant. A recent study of regional air quality[2] found that photochemical oxidant would be a persistent problem in the future, and that reductions in hydrocarbon and oxides of nitrogen emissions would be necessary to attain the federal standard for photochemical oxidant in the Bay Area. The project's emissions represent an increase of at most 0.01% in regional emissions. Recent photochemical oxidant modeling conducted for the proposed Yerba Buena Center[3] found that the emissions from that project resulted in no measurable change in Bay Area oxidant concentrations. The regional emissions for the Pacific Gateway project would be on the order of 5-10% of those for the Yerba Buena project; therefore, no measurable effect on regional oxidant concentrations would be anticipated.

(2) Electrical Power Use

The project's electrical demand would result in some increase in emissions from fossil fuel power generators. As

---

[1]See Transportation Impact Appendix, p. 102.

[2]Association of Bay Area Governments, Draft Environmental Management Plan, December 1977.

[3]San Francisco City Planning Commission and San Francisco Redevelopment Agency, Draft Environmental Impact Report, Yerba Buena Center, January 1978.

Pacific Gas and Electric Company currently uses power from several sources, including hydroelectric facilities, fossil fuel power plants, geothermal facilities and power imported from other regions, it is not possible to quantify the project's impacts on emissions nor to assess air quality changes.

(3) Space and Water Heating

Space and water heating for the project would be provided by natural gas fired boilers. Emissions from this source have been quantified for the peak demand month, and are shown in Table 12. Calculation methodology is explained in Appendix C (page 158).

Table 12

Peak Demand Month, Daily Emissions, Natural Gas

	Daily Emissions, (lbs/day)	Regional Emissions[1] (lbs/day)
Suspected Particulates	0.3	360,000
Carbon Monoxide	0.4	7,400,000
Hydrocarbons	0.2	2,000,000
Oxides of Nitrogen	2.3	1,320,000

The project would have a standby boiler system that would burn distillate fuel oil when and if natural gas supply were curtailed. Peak month daily emissions from this source are shown in Table 13, assuming that the sulfur content of the fuel was 1/2%.

[1]Bay Area Air Quality Control District, Emissions Inventory Summary Report, August 1976.

Table I3

Peak Demand Month, Daily Emissions, Fuel Oil

Pollutant	Daily Emissions, (lbs/day)	Regional[1] Emissions (lbs/day)
Particulates	2.1	360,000
Sulfur Dioxide	11.0	440,000
Carbon Monoxide	0.6	7,400,000
Hydrocarbons	0.4	2,000,000
Oxides of Nitrogen	8.7	1,320,000

Comparison of Tables 12 and 13 shows that natural gas is cleaner burning than fuel oil. This is particularly true for sulfur dioxide, which is almost nonexistent in natural gas emissions. It is not possible at this time to predict what percentage of the time use of fuel oil as a replacement for natural gas would be required, as shortages would be due to future changes in gas storage and transport, and would also be determined by seasonal temperature.

The above pollutant quantities would be released from the roof of the proposed building at a height of 443 feet. Predicting concentrations of these pollutants at ground level is not possible, because of the complicated effect of buildings on diffusion of pollutants. Buildings cause wind acceleration and deceleration, flow reversals and eddies that affect pollutant dispersal. The effect of these factors is to promote mixing and dilution of pollutants.

While quantification of concentrations is not possible, it is probable that by the time pollutants reached ground level downwind of the project, they would be thoroughly mixed by turbulence, and concentrations would be below the ambient air quality standards.

---

[1]Bay Area Quality Control District, Emissions Inventory Summary Report, August 1976.

(4) Relationship to the Air Quality Maintenance Plan

The following is a discussion of the policies and actions proposed in the Air Quality Maintenance Plan that appear to be relevant to the proposed project. These policies and actions may be modified before final approval of the Plan by the State and U.S. Environmental Protection Agency.

II. General Policy: Minimize Hydrocarbon Emissions from Motor Vehicles.

Action 10: Require provision of preferential parking for carpool vehicles. Would require large employers to set aside close-in parking for car-pools. "Large Employers" has yet to be defined.

Policy J. Improve the balance of jobs and housing to reduce long distance home-to-work travel: About 38% of all trips to the project would be from outside San Francisco. While this would appear to work against this policy, the high density, centralized nature of this project would result in 60% of all trips to the project being non-auto trips, which would appear to be consistent with the many other policies concerning emphasis of transit and other non-auto means of transportation.

Policy N. Indirect Source Review of Proposed Projects. The project would be an indirect source of pollutants, as its major effects are due to traffic rather than emissions on site. The purpose of this review is to ensure compliance with the land-use policies of the plan, and to ensure that localized CO problems are not created. The procedures and project size thresholds for Indirect Source Review have not been established; it is therefore not known if the proposed project would require review.

4. NOISE

a. Construction Impacts

Construction of the project includes the following stages: grading and excavation--4 to 6 weeks; foundation work, including piledriving,--4 to 6 weeks; steel work--about 5 months; and finishing the building--about 10 months. During grading and excavation maximum noise levels would be generated by bulldozers, graders, and trucks. The San Francisco Noise Ordinance[1] would limit the noise levels of these vehicles to 80 dBA at 100 feet. Piledriving noise typically ranges from 100-105 dBA measured 50 feet from the piledriver. During the steel work phase noise of steel banging against steel is common. The balance of the construction would not generate noise levels above the existing ambient.

The grading and excavation phase would cause no noise impact as predicted noise levels would be similar in character and intensity to truck traffic noise levels of 83-86 dBA in the area. Piledriving noise levels of 70-75 dBA would be clearly audible and potentially distracting in adjacent office buildings (with windows closed). The east side of the site has line-of-sight to the Hyatt Regency Hotel. Piledriving noise would be about 40 dBA and therefore barely audible in rooms facing the site (assuming closed windows).

b. Operational Impacts

The project would not increase vehicular traffic volumes on any streets sufficiently to cause a noticeable increase in noise.[2]

Mechanical equipment in buildings has in the past

---

[1] San Francisco Municipal Code, Ordinance No. 274-72 Part II, Chapter VII, Article 29.

[2] Traffic volume would be below the 33% increase needed to cause a just-noticeable increase in noise of dBA.

caused increased environmental noise levels in other areas of downtown San Francisco. Mechanical equipment noise is regulated by the San Francisco Noise Ordinance. The noise ordinance establishes a maximum level of 60 dBA between 10 p.m. and 7 a.m. and 70 dBA between 7 a.m. and 10 p.m. at the properties receiving the noise. Allowing 70 dBA during the daytime results in an increase of about 5-8 dBA over existing average levels (L_{50}'s) near the site. At this level, the mechanical equipment would be audible to pedestrians during lulls in traffic.

c. Compatibility of the Site for the Proposed Land Use

The criteria used to evaluate the suitability of the site for a project are contained in the Environmental Protection Element of the Comprehensive Plan, and are summarized below.

Land Use	L_{dn}	Land Use Consequence
Office Buildings	Less than 70	A. Satisfactory, with no special noise insulation requirements.
	65 - 75	B. New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.
	Greater than 72	C. New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

The project would fall within the Category B and C Land Use Consequences.

The building would have fixed double-pane windows (2-1/4" thick plates separated by a 1/2" air space) comprising about 27% of the exterior shell. This construction affords 30-35 dBA of noise reduction. Noise from trucks on the Beale Street on-ramp would reach 50-55 dBA and the L_{50} from

traffic would be 30-35 dBA in proposed offices and shops facing the on-ramp. As the average noise level from mechanical equipment and other building sources would be 35-40 dBA, the trucks would be audible above the building noise. General traffic noise would not be audible. Occasional intrusions of 50-55 dBA would not interfere with the typical office activities.

Pedestrians near the site and users of the proposed plaza area would be exposed to noise from traffic on Mission Street and the freeway ramps. During the peak hour events (truck passages) conversation may be interrupted. Peak use of the plaza (noon) does not coincide with peak traffic noise (late afternoon).

5. AESTHETICS

The proposed 443-foot building and parking deck would alter the openness of the Mission/Beale and Mission/Main intersections. The proposed structure would be similar in height to the 492 ft. Pacific Gas and Electric Company building located across Mission Street north of the site (Figure 16, page 66). These two buildings would form a street canyon that currently does not exist; the proposed building does not span the entire block width. Shadows from the proposed building would affect the Mission/Main Street intersection.

The landscaped plaza and pedestrian areas around the base of the proposed building change the character of the site. The removal of the existing fence surrounding the site and provision of the landscaped plaza with sitting areas would make pedestrian use of the site more attractive.

The building would be visible from the south over the freeway ramps and intervening lower buildings. The proposed building would not affect any view corridors; it would block views from the Pacific Gas and Electric building to the south.

Views from Interstate 80 towards downtown San Francisco would remain essentially unchanged, as the height, bulk and coloration of the proposed building would be similar to

existing structures. Drivers using the Main Street freeway exit ramp would view the building traveling north. Present views of the Pacific Gas and Electric building would be replaced by views of the proposed project. A study of the geometry, frequency, and severity of sun reflections from the proposed building as they would affect drivers on the off-ramp found that the building orientation and percentage of exterior glass would make sun-reflection problems unlikely (see Appendix D, page 163).

The proposed building would be visible from distant vantage points such as Twin Peaks, Bernal Heights and Potrero Hill. Figures 14, 15, and 16 show the outline of the proposed project overlain on photographs taken from these points.

Viewed from Twin Peaks (Figure 14), the proposed building would partially block views to Yerba Buena Island and the Bay. The project's mass and height would be similar to existing structures, but would be located in what is presently a gap between structures.

Viewed from Bernal Heights, the proposed structure would be partially screened by intervening structures, and would not affect the skyline (Figure 15). As the structure is similar in height to several others in the vicinity, it tends to further blunt the skyline.

Viewed from Portrero Hill (Figure 16), the proposed structure would fill in an existing gap in the skyline. While it would not affect any view corridors, it would make the skyline more uniform.

The Urban Design Element of the San Francisco Comprehensive Plan[1] contains objectives and policies for the physical character and nature of change within the City. Under "Policies for City Pattern," the following would apply to the project:

---

[1]San Francisco Department of City Planning, The Comprehensive Plan: Urban Design, August 1971.

Proposed Building Viewed From
Twin Peaks

Regional View

FIGURE 14

Proposed Building Viewed From
Bernal Heights

Regional View

FIGURE 15

Proposed Building Viewed From
Potrero Hill

Regional View

FIGURE 16

Policy 1: Recognize and protect major views in the city, with particular attention to those of open space and water.

Under "Policies for Major New Development" the following would apply to the project:

Policy 2: Avoid extreme contrasts in color, shape and other characteristics which will cause new buildings to stand out in excess of their public importance.

Policy 3: Promote efforts to achieve high quality of design for buildings to be constructed at prominent locations.

Policy 6: Relate the bulk of the buildings to the prevailing scale of development to avoid an overwhelming or dominating appearance in new construction.

The project would not entirely comply with Policy 1 under City Pattern but would comply with Policies 2 and 6 under Major New Development. Policy 3 under Major New Development would promote high quality design for buildings in prominent locations. With its viewability from the freeway, the project would be in a prominent location and high quality design would be desirable. The building's low base and lack of differentiation of the base from the rest of the building might be criticized as not providing the scale and space-defining qualities desired at that location. However, any plan evaluated for design qualities would meet with criticism from some and praise from others.

6. ENERGY CONSUMPTION

Natural gas would be used for domestic water and space heating. Electricity would be used for building lighting, power, elevators, ventilation and air conditioning. An application to Pacific Gas and Electric Company is being prepared to provide natural gas and electricity to the project. Low sulfur content

fuel oil would be used to power the standby generator and the fire pumps, to be used in case of power failure.

a. Natural Gas

The maximum natural gas consumption would be 1857 cubic feet per hour. The average daily consumption of natural gas would be 2.5 British Thermal Units (BTU)[1] per square foot of interior floor space per work day. The average daily cubic foot consumption for January, the month requiring the greatest natural gas consumption, would be 2790 cubic feet per day. This estimate is based on data set forth in Title 24, California Administrative Code, assuming that the building would be occupied for 252 days per year and that the heating value of natural gas is 1050 BTU's per cubic foot. The anticipated Daily and Annual Natural Gas Load Distribution Curves are shown in Figure 17. The two peaks in natural gas consumption are due to early morning and evening heating demand.

Natural gas would be burned in boilers to provide domestic hot water to the lavatories throughout the building and space heating for the project. Provisions have been made to allow conversion to alternate fuel sources for the domestic hot water or space heating.

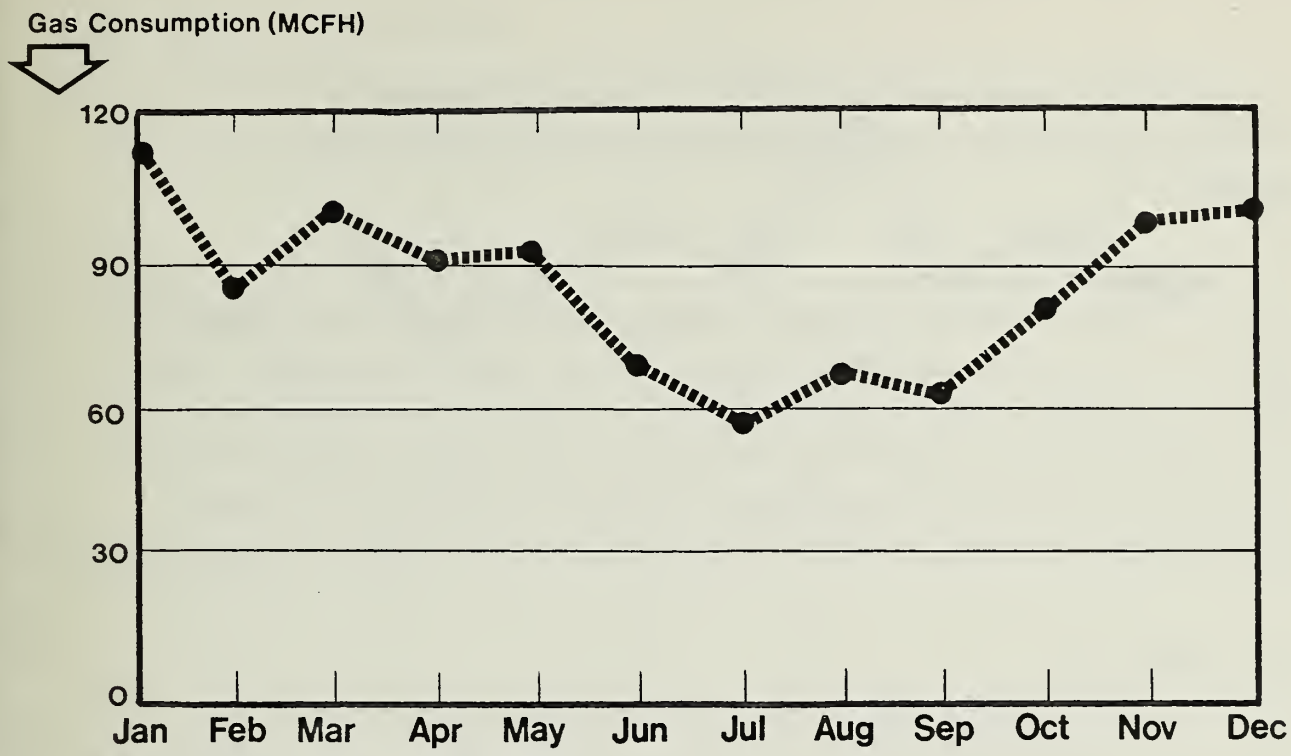
b. Electricity

Calculations indicate a connected load of 7520 Kilowatts with a demand load of 4380 Kilowatts.[2] The average daily maximum consumption is calculated to be 27,800 Kilowatt hours. This is equivalent to 0.042 Kilowatt hours per square foot

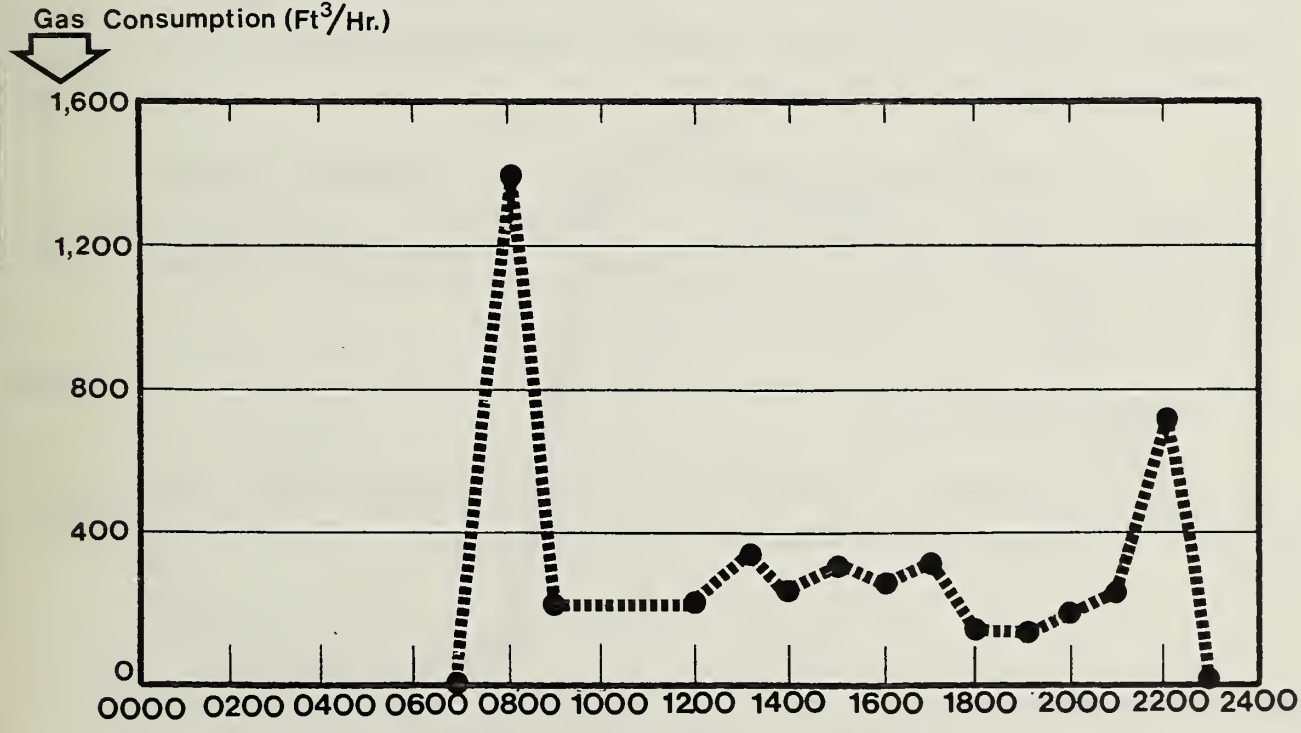
---

[1]BTU: A standard unit for measuring heat. It is the quantity of heat required to raise the temperature of one pound of water 1° Fahrenheit (251.98 calories) at sea level.

[2]Connected load refers to the rated maximum load of all electrical appliances; demand load refers to the expected demand given the intermittent use of the appliances and equipment.



Monthly Consumption



Hourly Consumption

Daily and Annual Natural Gas Consumption

FIGURE 17

of enclosed space per work day. The anticipated Daily and Annual Electrical Load Distribution Curves are shown in Figure 18.

c. Total Energy Use

The combined annual natural gas and electrical consumption would be 111,000 BTU's per square foot of enclosed space. This is 15,000 BTU's per square foot below the 126,000 BTU's per square foot allowed by Title 24, California Administrative Code even though the electrical portion has been increased by a factor of three (3) in keeping with the Title 24 directive.[1]

7. LAND USE

The project would change site use from a parking lot to an office building use and parking structure. This would extend the south edge of the main downtown highrise district one block further. The only present commercial use of the site, a billboard, would be removed.

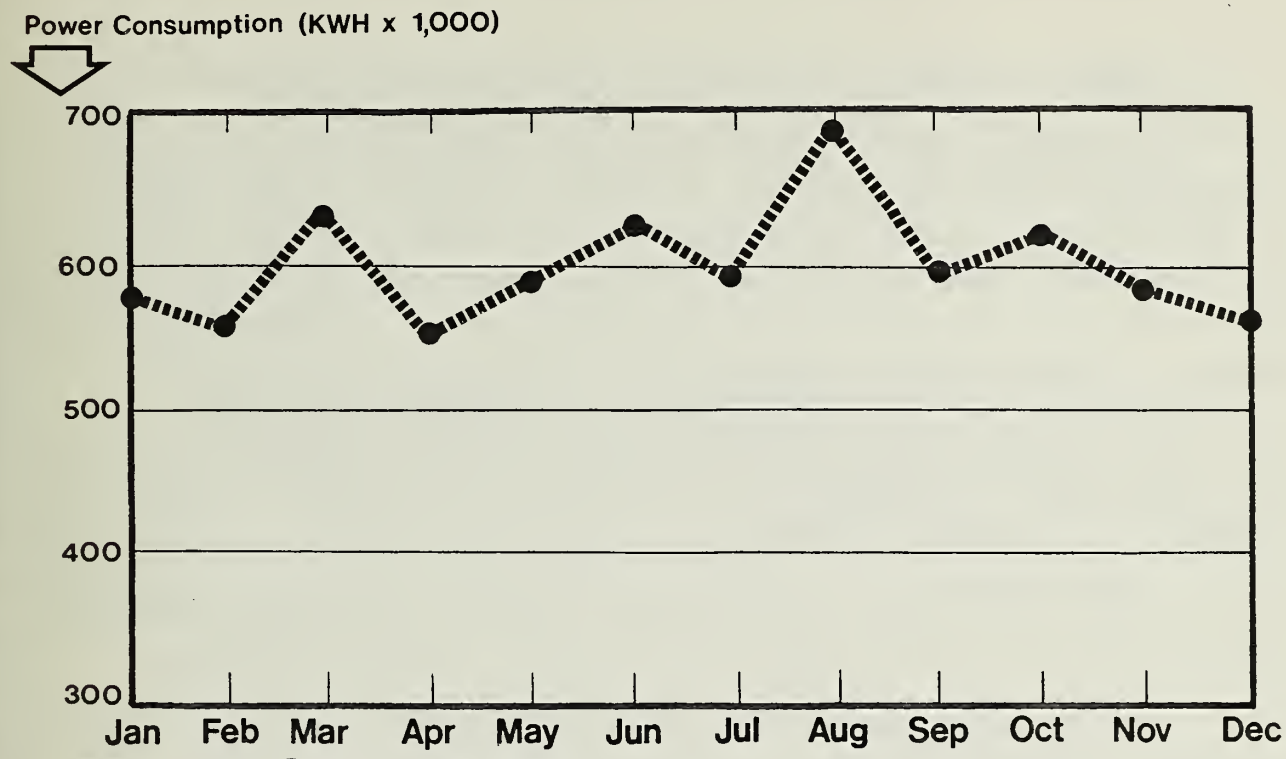
The project would not affect other locations directly, but could cause secondary land use changes such as development of commercial and eating establishments in the area to serve the employees in the proposed building.

8. COMMUNITY SERVICES

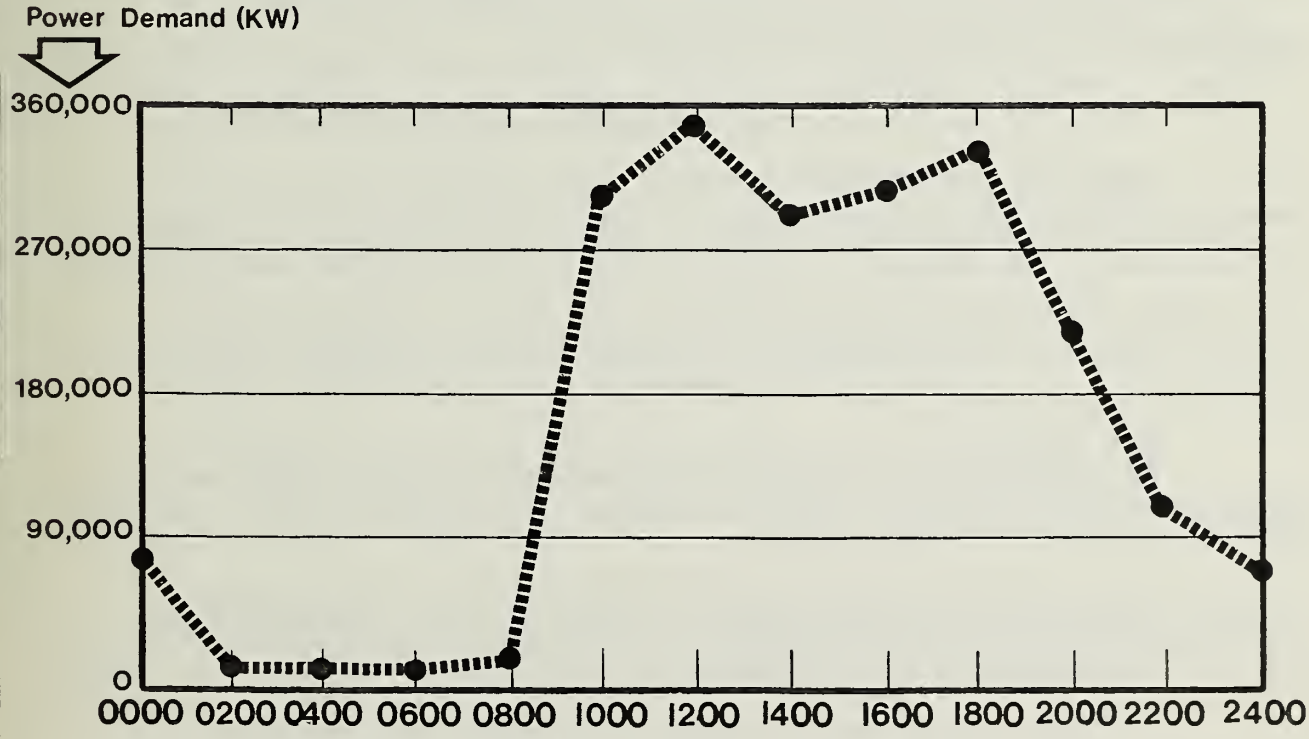
The increased population on site would increase demand on public and private utilities and services.

---

[1]Because a portion of the electricity is generated through combustion of fossil fuels in power plants, generation of one BTU of electrical energy is assumed to require 3 BTU of natural gas due to the inefficiencies of generation and transmission line losses.



Monthly Consumption



Hourly Consumption

Daily and Annual Electricity Use

FIGURE 18

Water use on the site would be for sanitation, drinking, cooling tower operation and irrigation of landscaping. Preliminary water consumption estimates indicate a peak demand of 300 gallons a minute for general use, 60 gallons per minute for restaurant use, and 50 gallons per minute for cooling tower make-up, giving a total peak demand of 410 gallons per minute. Domestic use is estimated at 25 gallons per day per person giving a daily total use of 67,500 gallons per day. Landscaped areas would be hand-watered. No estimate of irrigation use is available.

Water Department facilities located in adjacent streets provide adequate water supply for domestic and fire demands.[1]

Solid waste generation is estimate at 3.3 tons per day, based on a general factor of 1 pound per 100 square feet of floor space.[2] This represents a 0.0007 percent increase in San Francisco's yearly refuse generation.

During dewatering of the project excavation site, an unknown quantity of seepage and rainfall would enter the City sewage system. Upon completion, 67,500 gallons per day used for sanitary and domestic purposes would be discharged into the City's sanitary sewer system. Currently, sewage from the project area receives primary treatment[3] at the North Point

---

[1]J. E. Kenck, Manager, San Francisco Water Department, letter dated 15 November 1978. A copy is on file at the Office of Environmental Review.

[2]California Solid Waste Management Board, Solid Waste Generation Factors in California, Bulletin No. 2, Technical Information Services, 8 July 1974.

[3]Primary treatment: Removal of suspended matter by settling, scum removal, and disinfection. Little or no colloidal and dissolved matter is removed.

Water Pollution Control Plant. When the project is completed (1982) it is planned that sewage in the area would be routed through transport/storage mains to the expanded Southeast Treatment Plant, where it would receive primary and secondary[1] treatment.[2] Sewers in the project vicinity are adequate for project flows.[3]

The San Francisco Fire Department predicts that the proposed project would not require additional manpower or equipment.[4] The San Francisco Police Department does not feel it is possible to estimate impacts on manpower or equipment needs.[5]

---

[1]Secondary treatment: Treatment of wastewater after primary treatment, usually by bringing it into contact with micro-organisms that feed on the impurities and convert them into carbon monoxide, water, and more cell material. Secondary treatment removes 85% of the suspended solids and 85% to 90% of the biochemical oxygen demand (BOD).

[2]San Francisco City Planning Commission and San Francisco Redevelopment Agency, Environmental Impact Report: Yerba Buena Center, E.E. 77-220, 1977.

[3]Don Birrer, Civil/Sanitary Engineer, San Francisco Wastewater Program, letter dated 1 December 1978. A copy is on file at the Office of Environmental Review.

[4]Robert E. Rose, Chief, Division of Planning and Research, San Francisco Fire Department, letter dated 28 November 1978. A copy is on file at the Office of Environmental Review.

[5]Thomas L. O'Donnell, Planning and Research Division, San Francisco Police Department, letter dated 22 November 1978. A copy is on file at the Office of Environmental Review.

9. HISTORICAL AND ARCHEOLOGICAL RESOURCES

The proposed project would not affect any historical landmarks and would not involve destruction of any structures.

The excavation for the basement of the highrise structure would possibly uncover buried artifacts. However, the construction of basements for buildings previously on site required excavation down to 12-13 feet below the sidewalk. In this area of the site, the depth of the fill material is about 12 feet,[1] so that all fill had been removed for these basements. Approximately two-thirds of the building site was affected (see Appendix F).

The previous construction on the site involved the driving of approximately 465 piles within the area to be excavated for the proposed office building. Any large or fragile artifacts would most probably have been destroyed by the driving of the piles. These piles affect about 80% of the building site.

Piles would be used to support the proposed office building. These piles would be capped[2] at a depth below that of the fill on site. It is unlikely that archeological resources would be located at such a depth that they would be affected by pile driving.

The proposed parking garage would also be supported on piles. About 10% of the parking garage site has not been previously excavated and/or covered by a pile-supported structure. The destruction of previously undisturbed artifacts is therefore unlikely.

---

[1] Harding-Lawson Associates, Foundation Investigation Pacific Gateway Office Building, HLA Job No. 3343, 022.04, June 1978.

[2] A piling cap is a pad of concrete that transmits building loads to an array of pilings.

10. ECONOMIC ENVIRONMENT

a. Employment

Based on analysis of comparable projects, it is estimated that construction of the building would provide approximately 300 person years of employment in the construction trades, with a payroll of $11 million.

Permanent employment generated by the project is estimated for: (1) office employees, (2) retail employees, and (3) building maintenance workers. The number of office employees would depend on the type of tenants which lease the space; general office tenants have higher employment densities than professional firms.[1] The tenant mix has not been determined for this project.[2] Based on data provided in the SPUR report,[3] it is estimated that 572,000 sq. ft. of net rentable floor area would accommodate between 2,500-2,900 permanent employees, distributed by occupation as follows:

Clerical	44%
Professional and Technical	30%
Managers and Proprietors	19%
Sales	5%
Other/Not reported	2%
	100%

As the developer has indicated that one parking lot employee presently works at the site,[4] new employment provided

---

[1] San Francisco Planning and Urban Renewal Association, Impact of Intensive High Rise Development on San Francisco, 1975.

[2] W. A. Finsterbusch, Southern Pacific Development Company, phone conversation, 24 May 1978.

[3] San Francisco Planning and Urban Renewal Association, Impact of Intensive High Rise Development on San Francisco, 1975.

[4] W. A. Finsterbusch, Southern Pacific Development Company, phone conversation, 24 May 1978.

as a result of the project would represent a net gain at the site as quantified above. Although some of the jobs located in the proposed building might not be new jobs in San Francisco, the net effect of the project would be to increase the number of employees in downtown San Francisco, as space vacated in older buildings would be made available to other office tenants. The number of employees in 7,550 sq. ft. of ground floor commercial space would depend on the nature of the tenants, with restaurants and retailing providing greater employment than financial institutions. The ground floor space could accommodate 20-40 employees.

Building maintenance for the proposed project would require a work force of approximately 50 persons.[1]

b. Secondary Impacts

Construction and operation of the proposed project would affect personal income and retail sales in San Francisco. A survey of construction workers on city projects by the Human Rights Commission[2] indicated that a maximum of 40% of workers on construction occurring in San Francisco live in San Francisco. On this basis, it is estimated that a maximum of $4.4 million in construction payroll would accrue directly to City residents. Previous studies have indicated that San Francisco resident employees spend 80% of their disposable income in the City, which creates sales and service jobs.[3] Nonresident construction workers would spend approximately 10% of their disposable income[4] in San Francisco.[5]

---

[1] SPUR, Impact of Intensive High Rise Development on San Francisco, 1975.

[2] San Francisco Department of City Planning, Final Environmental Impact Report, 180 Montgomery Street, EE. 76.162, July '77.

[3] Ibid.

[4] Income, wages, salaries and other sources minus tax payments.

[5] San Francisco Department of City Planning, Final Environmental Impact Report, 180 Montgomery Street, EE. 76.162, July '77.

Based on Keyser Marston Associates, Inc.'s surveys of downtown office workers, it is estimated that annual expenditures by office workers in the downtown are $900 per capita (1978 dollars), distributed as follows:

Furniture, home furnishings, and appliances	29%
Meals in bars and restaurants	25%
Apparel, footwear, and accessories	24%
Miscellaneous	12%
Cosmetics, drugs, and toiletries	5%
Groceries and bottled alcoholic beverages	5%
Total	100%

Total downtown expenditures by permanent employees of the proposed office building are estimated at between $2.25 million and $2.60 million annually.

C. Public Revenues

The proposed project would generate property tax, payroll expenditures tax, and sales tax revenues to the City and County of San Francisco.

At a construction cost of $30 million, the project would generate $450,000 annually in property taxes (including personal property), at the prevailing tax rate of $5.06 per $100 of assessed valuation.

The payroll expense levy for 2,500-2,900 employees is estimated at $200,000-$300,000 annually to the City and County of San Francisco.

The local share of the tax on retail sales by office building employees is estimated at $20,000 annually, based on the percent of sales by office employees which are taxable.

The three sources of municipal revenue quantified above would generate approximately $670,000-$770,000 annually, distributed as follows:

Property taxes	$450,000
Payroll taxes	$200,000-$300,000
Retail sales taxes	$ 20,000
Total	$670,000-$770,000

d. Effects on Market for High-rise Office Space

Construction of the project would place on the market 572,000 sq. ft. of office space in downtown San Francisco, representing approximately half of the annual average square footage of 1,300,000 sq. ft. provided since 1960.[1] Under present market conditions space of this amount would be absorbed.[2] In no year since 1945 has the overall vacancy factor for downtown office space exceeded 10%,[3] including the years 1970-1975 when an average of nearly 1.8 million sq. ft. was constructed annually. Three-quarters of all the new office space made available in 1977, 3.55 million sq. ft.,[4] was occupied by the owners, and most of the planned space was preleased.

e. Indirect Effects on South of Market Area

The project would intensify commercial development in the South of Market area, although site cost and availability factors, redevelopment activity, and improved access would continue to stimulate development in the area whether or not the project is built.

The project could make more feasible the development of retail and ancillary ground-floor commercial uses on other

---

[1]Charles Gill, San Francisco Planning Department, telephone communication, 15 February 1979.

[2]Bob Wetmore, Keyser Marston Associates, personal communication, 5 March 1979.

[3]Scott Stephens, Staff Assistant, San Francisco Building Owners and Managers Association, phone conversation, 24 May 1978.

[4]Charles Gill, San Francisco Planning Department, telephone communication, 15 February 1979.

sites due to the increase in daytime population in the area. The expenditures of office employees would total $2.25 million to $2.60 million annually in the downtown, a portion of which would be spent in the immediate area.

11. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE OF LONG-TERM PRODUCTIVITY

The project would commit the site to the proposed uses for at least several decades and thus limit its use for other purposes which might in the future be deemed desirable. The location of the proposed site is in a developed area where commercial buildings make up the majority of land uses. The zoning of this area for high-rise development and, in turn, the assessment of the land for this type of development leave no reason to believe that there would be any change in land uses in the next several decades. It is likely that the use of the proposed site for highrise development would eventually occur if this proposed project were not implemented, unless the City should rezone the area.

12. IRREVERSIBLE ENVIRONMENTAL CHANGES RESULTING FROM IMPLEMENTATION OF THE PROJECT

Completion of the proposed project would change the land use of the site from parking lot use to high-density commercial-office use. This increased density would promote higher-intensity use of the area, which can be considered an irreversible environmental change.

Other irreversible changes include shortened views from adjacent buildings and the use of nonrenewable energy and material resources in the construction and operation of the proposed building.

13. THE GROWTH-INDUCING IMPACT OF THE PROPOSED ACTION

The proposed project is one element of a general pattern of highrise office development in the downtown area, a trend that has been under way for 20 years. This growth has been in response to increased demand for office space located in downtown San Francisco.

The project would increase the daytime population of the area and generate new auto and pedestrian trips. The tenants of the proposed building would probably be largely existing firms which relocate from other buildings (with or without expanding in the process), rather than firms new to the area; the effect for the area would be a net increase in jobs and employees.

The project is on the present southern outskirts of the downtown highrise area. This extension of the highrise district would result in new opportunities for the development of new commercial establishments such as restaurants, shops, stores and banks to serve the increased population of the area.

IV. MITIGATION MEASURES TO MINIMIZE THE PROJECT'S IMPACT

1. INCREASED ENERGY USE

The following energy conservation techniques have been incorporated into the design of the building or are being evaluated for the project in an effort to minimize overall energy consumption.

a. The precast panels used to form the exterior of the building have been specially designed and insulated to provide a "U" value of 0.15.[1] This would minimize the solar heat gains and the transmission heat gains and losses to and from the building.

b. The windows would be double glazed with the outer sheet of solar gray glass. Double-glazed windows reduce the transmission heat gains and losses by more than 50% in comparison to a single glazed window. The solar gray glass would reduce insolation by more than 40% in comparison to clear glass.

c. Piping and ductwork would be provided as per Title 24, California Administrative Code.

d. Two energy recovery systems were evaluated for inclusion in the design. A water-side economizer that uses cooling-tower condenser water to provide building cooling when outside conditions are conducive has been included in the project design. A side-arm condenser to preheat the domestic water supply was also evaluated but was not considered cost efficient. The side-arm condenser and water-side economizer are mutually exclusive systems.

---

[1] "U" value is the reciprocal of the thermal resistance of a material. Heat gain or loss is proportional to the U value. Thus heat gains or losses, for a given temperature differential, would be twice as great for a material with U = 0.50 compared to a material where U = 0.25.

e. Energy efficient air conditioning equipment would be used.

f. Lavatories in washrooms would be equipped with devices which would limit the outlet temperature to 110°F.

g. Energy-efficient fluorescent lighting would be used exclusively. Prismatic lenses would be used to provide for general and task-oriented lighting.

h. Local switching would be provided to allow variation in lighting levels from one part of the building to another and to allow lights to be turned off when not needed.

i. Levels of lighting would be in compliance with standards established by the energy conservation provision of Title 24, California Administrative Code.

j. A computerized energy management system is included in the design to control lights, fans, etc., to reduce peak demand and take advantage of "time-of-day" metering system of varying electrical rates designed to encourage shifting peak demands from the afternoon hours to other times of the day.

2. OTHER IMPACTS

a. Seismic Hazard

A soils engineering study has been completed for the site,[1] and has been used with the City's structural design requirements to develop the foundation design of the building. This procedure conforms with Policy Four of the Community Safety Element of the Comprehensive Plan of San Francisco, which in part states that "Special site investigations should be required in these (geological) hazard areas to determine the actual hazard, if any, for all proposed new development. Based upon the findings of this site investigation and determination of type and degree of (geological) hazard present, appropriate engineering design should be required to ameliorate this

[1] A copy is available for public review at the Office of Environmental Review, 45 Hyde Street, San Francisco.

(geological) hazard."[1]

b. Groundwater and Storm Drain Impacts

The use of sheet piling around the perimeter of the foundation excavation to a depth where Bay mud is encountered limits seepage into the excavation. This would reduce groundwater level reductions in adjacent areas, and would reduce the flow of water into the storm drainage system from site de-watering.

c. Transportation and Pedestrian Impacts

The following measures would mitigate some of the adverse transportation and circulation impacts of the project.

(1) To ensure that no service vehicles use Mission Street for loading, tenants of the office building would be required to use the loading facilities provided in the parking lot. This provision would be incorporated in leases.

(2) Due to the pedestrian use of the parking lot for access to Howard Street, provision would be made for a pedestrian walk-way along the driveway.

(3) Bicycle facilities would be provided that are both protected from the weather and within sight of the building to provide a measure of security for both employee bicycles and delivery service bicycles.

(4) Tenants should be encouraged to promote carpooling and vanpooling and operate staggered work hours. With the number of large office buildings under construction and being proposed within the San Francisco Financial District (C-3-0 Zone), this mitigation

---

[1]San Francisco Department of City Planning, A Proposal for Citizen Review, Community Safety Plan for the Comprehensive Plan of San Francisco, July 1974, p. 43.

measure becomes critical if the transportation facilities are expected to accommodate demand generated by the new offices. In particular, staggered work hours appear to be a viable approach. Carpooling and vanpooling are valid alternatives but staggered work hours have the potential to mitigate the transportation impacts to a greater degree than carpools and vanpools.

With staggered work hours, the existing capacity of transportation facilities serving this area can be better utilized. For transit, if existing capacity is better utilized, extensive capital expenditures and operating costs would not be required, and, therefore, more costs would be covered through the fare box.

To promote carpooling and vanpooling, priority parking should be provided. The developer has investigated leasing the remaining space under the freeway off-ramps adjacent to the site. This land is put up for bid each year to commercial leasers and is leased to the highest bidder. Within the next fiscal year, 40% of all spaces on Caltrans property will be reserved for van pools at $10 a month,[1] no matter who leases the property. Therefore, there would be approximately 45 van pool parking spaces within the two parking lots under the Main and Beale ramps, assuming a self-park parking system. The proximity of these spaces to the proposed office provide an incentive for van pooling by employees in the building.

---

[1] Mr. M. C. McCarthy, Caltrans, telephone discussion, 1 March 1979.

(5) The bus stop on the southwest corner of the Mission/ Beale intersection would be moved to the southeast corner and the eastbound diamond transit preferential lane would end at Beale Street rather than Main Street. This would provide better transit access to the site and reduce bus/auto conflicts for cars turning right onto Beale from Mission Street. The diamond lane on the north side of Mission would be retained to discourage drop-offs.

d. Increased Air Pollution Emissions

The project's location in the downtown area of San Francisco can be viewed as a mitigation measure for regional air quality. The combination of transit access from the S.F. Municipal Railway, BART, A.C. Transit, Sam Trans and Golden Gate Busses results in an estimated 60% non-auto transportation split. The other 40% of the trips made by automobile would add to the already heavy traffic volumes existing in this area.

The following are additional measures that could be implemented:

(1) establishment of a carpool/vanpool system
(2) shuttle system to regional transit centers
(3) staggered work hours
(4) transit incentives

These measures are currently not included as part of this project. As the building's tenants are unknown, the project sponsor can only encourage their development by tenants. Requiring tenants to adopt these programs through lease agreements would, in the project sponsor's opinion, reduce the desirability of the building and place the building at a competitive disadvantage, unless such programs were developed citywide.

e. Increased Noise

The San Francisco Noise Ordinance would be enforced during construction. The San Francisco Department of Public Works enforces the Ordinance. The pile driver must have intake and exhaust mufflers recommended by the manufacturer and/or approved by the Director of Public Works.

Mechanical equipment noise would be controlled down to the existing level on the site (62-65dBA) by:

(1) using appropriately sized equipment
(2) specifying "quieted" equipment
(3) adding silencers, attenuators, isolators or shields as needed

f. Historical Archeological Impacts

If anything of potential archaeological or historical import is found on the site, the contractor would be legally bound by its contract to stop construction to permit professional evaluation of the finds. Should any cultural or archaeological artifacts be found during excavation for the proposed project, the Environmental Review Officer and the President of the Landmarks Preservation Advisory Board would be notified. Any artifacts found would become the property of the Project Sponsor.

The Environmental Review Officer would recommend mitigation measures, if any are deemed necessary. All recommendations would be sent to the State Office of Historic Preservation. Excavation or construction that may be damaging to the cultural resources discovered would be suspended for up to a maximum of four weeks to permit inspection, recommendation, and retrieval (if appropriate).

g. Loss of Site Vegetation

The removal of existing trees on the site would be mitigated by the landscaping of the pedestrian plaza and parking areas of the site. Landscaping vegetation would include Black Acacia, Algerian Ivy, London Plane Tree, Japanese Privet and Lombardy Poplar.

V. UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

The proposed project would result in increases in noise, airborn dust and traffic congestion while construction is underway.

The project would result in an increased use of private automobiles in the downtown and region, with attendant congestion and air pollutant emissions impacts. The number of pedestrians in the downtown area would be increased.

The new building would increase the extent and duration of shadows in pedestrian areas near the site, increasing the frequency of uncomfortable outdoor conditions. The building would alter the skyline as viewed from the south and southwest; because of the building's similarity to nearby buildings in bulk and height, it would tend to "blunt" the skyline.

Demand on public transit would increase, as would demand for other public services such as police, fire protection, and utilities. While this additional demand would not exceed the existing capabilities of any service other than transit, the continued growth in downtown office-related uses has contributed to the need to expand service capacities (e.g., acquisition of new Muni vehicles).

The proposed project would consume non-renewable resources for building materials and fuels used in construction and transport and fabrication of building materials.

VI. ALTERNATIVES

1. NO PROJECT

This alternative would leave the site in its present condition and would continue the site's use as employee parking. The project sponsor would not be able to consolidate offices, and, because of impending demolition of buildings where Southern Pacific employees currently work, new employee offices would have to be located. The project sponsor could develop an office building at another location.

Not building the project would avoid the traffic, pedestrian, noise, air quality and visual impacts of the project. The additional demand for public services and energy would not occur, unless the project sponsor were to elect to build a similar project elsewhere to meet the objectives of this project.

If the project were not built, 300-person years of construction employment, with a payroll of $11 million, would not occur; $670,000-$770,000 in annual municipal revenues would not be generated; $2.25 million-$2.60 million in additional retail sales in the downtown would not occur annually. There would be no additional demand for public services such as transit, sewage, fire and police protection.

2. OTHER USES OF SITE

The mixed C-3-0 and C-3-S zoning of the site would allow commercial, business services, and wholesaling use of the site. With a condition use permit, residential and parking garage uses are allowed.

a. Commercial Uses and Business Services

These types of uses include hotel, retail sales, restaurant and commercial services. In general, these uses generate trips at a much higher rate than office space, so that larger impacts on traffic, transit, pedestrian flow, air quality and noise would occur for an equivalent project size. However, the inconvenient access to the site, lack of visual amenities and the site's location at the outskirts of the Central Business District suggest that development of the site for these uses would be less intensive.

The energy impacts of other uses would probably be less due to the likelihood of less intense development, as would visual impacts. Revenue generation from property taxes and employment payroll levies would be less; commercial use of the site, however, would increase sales taxes generation from the site.

b. Wholesaling

Wholesaling or warehousing use of the site would in general be a much less intensive use of the site; it would have less impact on energy, aesthetics, traffic, air quality, transit and pedestrians. Tax revenues would be less, as would employment.

Such uses would not relate well to nearby offices. The restricted access to the site and congested traffic conditions on nearby streets would result in problems for alternatives involving truck travel to the site.

c. Residential

Trip generation by residential use would be lower than the project as proposed. The percentage of trips by auto would be less, while the percentage of trips by foot or transit would be higher. Therefore, traffic impacts (and resulting air quality and noise) would be less, while pedestrian and

transit impacts could be either greater or less, depending on the size of the residential development.

Residential energy use per unit area of occupied floor space is higher than for office space, so that energy impacts would be greater.

Total revenues from such a project would be less than for the project as proposed due to the absence of employee payroll levy revenues.

d. Parking Garage

With a conditional use permit the site could be developed as a commercial parking garage. The total trip generation of such a facility would be far less than the project as proposed, so that impacts on pedestrian traffic and transit would be less. However, the number of trips ending and originating on the site would be greater, so that impacts on traffic conditions, air quality and noise would be greater. Employment revenue and economic impacts would be lower with this alternative.

3. ALTERNATIVE DESIGNS

Both smaller and larger buildings would be possible on the site. The impacts of a different-sized project would in general be proportional to size in that building population as trip generation, parking demand and energy demand are proportional to floor area.

A taller building would require an additional bank of elevators, reducing the operating efficiency of the building, reducing the ratio of net rentable space to floor area, and increasing construction costs per leasable square foot of space.

Smaller buildings are possible. Such a building would be required under an initiative that is currently proposed by San Francisco Tomorrow. The proposed Planning Code modifications

would reduce existing building height and Floor Area Ratio (FAR) limitations in the downtown area. The largest structure that could be built under these proposed code changes would be a 19-story building with about 370,000 sq. ft. of space. Because of the particular soil conditions and foundation requirements of the proposed site, the cost per rentable square foot of space for the smaller building would be higher than for the building proposed. According to the project sponsor, it would be difficult to construct a building of similar quality to the proposed project on the proposed site at the reduced size and remain competitive with other office space in San Francisco. To reduce construction costs, less expensive materials (e.g., single paned windows, conventional heating/cooling systems) might be used and non-essential features deleted.

The impacts of a smaller building on traffic, transportation, energy, air quality and other areas related to building size would be proportionately less than for the proposed project. The effect of a smaller building on views would be less at a distance from the site (e.g., Twin Peaks), but would be the same at street level near the site.

Alternative exterior treatments, glazing and mechanical systems are possible. The partially-revealed exterior surface of precast concrete with double-paned glass was selected partially for aesthetics and for energy conservation. A fiberglass concrete laminate exterior surface was considered because of its light weight. Its use would have allowed a savings in structural steel, but a dependable manufacturer could not be found.

The double paned windows, although more expensive than conventional single-paned windows, were selected to minimize energy losses and long-term costs.

An alternate location for the public plaza would be at the south entrance to the proposed building. This location would have the advantage of lower winds because it would be protected from prevailing winds by the high-rise building, but it would also have less sunshine during the mid-day because of shadows cast by the parking garage. Construction of earth berms along the east and west sides of the site would partially screen public areas from the visual effects of traffic. A berm, however, would not reduce traffic noise from the elevated freeway ramps.

4. DEVELOP AT A LATER DATE

Postponement of construction would result in increased construction costs; other impacts would be the same as for the proposed project. In the last five years, construction costs for high-rise office buildings in Northern California have increased at a compound annual rate of nearly 9%.[1] At an estimated construction cost of $30 million in 1980, the cost of the building would increase as follows as a result of delays:

Years/Delay	Construction Cost
1 year	$33 million
3 years	$39 million
5 years	$46 million

Because of impending loss of office space currently occupied by Southern Pacific employees, new office space would have to be found either by constructing a building on a different site or by leasing office space in existing buildings.

Delay would perhaps allow development of solutions to existing traffic and transit problems in the Central Business District. Delay might also result in the City establishing

---

[1] Real Estate Research Council of Northern California, Northern California Research Report, vol. 29, no. 1, 1978.

a consensus on the current controversy over continued highrise construction, prior to project implementation.

5. ALTERNATIVE PEDESTRIAN ACCESS

The City Traffic Engineering Department has examined the problem of pedestrian access to the site and has proposed a plan for the Mission and Beale Street intersection and two plans for the Mission and Main Street intersection. The exact nature of intersection modifications, costs and financial responsibility for modifications have not been determined.

The Mission and Beale Street plan provides pedestrian access to the site. New crosswalks would be provided across Mission and Beale Streets. The proposal would require a modification in the signal phasing, lane restriping and addition of a pedestrian island in the middle of the south leg of Beale Street. The traffic impacts of this alternative are those discussed in the traffic impacts section of this EIR.

The first plan proposed for the Main Street/Mission Street intersection would provide crosswalks across both streets. New lane striping, channelization and signal phasing would be required. Implementation of this plan was assumed for the analysis of traffic and pedestrian impacts for the proposed project.

The second plan for the Main Street/Mission Street intersection, favored by the City Traffic Engineer, would include a crosswalk across Main Street and the off-ramp. This would provide greater protection for pedestrians and improve signal phasing and traffic flow through the intersection, according to the City Traffic Engineer. New lane striping, channelization and signal phasing would be required.

VII. EIR AUTHORS; ORGANIZATIONS AND PEOPLE CONSULTED

Author of Environmental Impact Report

San Francisco Department of City Planning
100 Larkin Street
San Francisco, California 94102
(415) 558-3056

Environmental Review Officer: Selina Bendix, Ph.D.
Coordinator: Xandra Malanda

Author of Preliminary Draft Environmental Impact Report

Donald Ballanti
Meteorological and Environmental Consultant
1424 Scott Street
El Cerrito, California 94530
(415) 234-6087

Project Sponsor

Southern Pacific Development Co.
1 Market Street
San Francisco, California 94105
(415) 362-1212

Attention: William Finsterbusch

Architects

Primiani-Weaver Architects
1 Market Plaza
San Francisco, California 94105
(415) 777-5858

Attention: Conley Weaver

Traffic Consultant

Barton Aschman Associates
Suite 270, 4320 Stevens Creek Blvd.
San Jose, California 95129
(408) 249-5300

Attention: Pat Gibson

(EIR AUTHORS; ORGANIZATIONS AND PEOPLE CONSULTED)

City and County of San Francisco

Police Department
850 Bryant Street
San Francisco, CA 94103
(415) 553-9111
Attention: Lt. Thomas O'Donnell

Fire Department
260 Golden Gate Avenue
San Francisco, CA 94102
(415) 861-8000
Attention: Robert E. Rose

Wastewater Program
770 Golden Gate Avenue
San Francisco, CA 94102
(415) 558-2131
Attention: Don Birrer

Water Department
1990 Newcomb Avenue
San Francisco, CA 94124
(415) 558-4501
Attention: J. E. Kenck

Traffic Engineering
460 McAllister
San Francisco, CA 94103
(415) 558-3371)
Attention: Sealt Shoaf, C17656,
Traffic Engineer

Department of City Planning
100 Larkin Street
San Francisco, CA 94103
(415) 558-3056
Attention: Charles Gill, Richard Hedman,
Gail Bloom, Gary Craft

Municipal Railway
949 Presideo
San Francisco, CA 94115
(415) 673-6864
Attention: Peter Straus

(EIR AUTHORS; ORGANIZATIONS AND PEOPLE CONSULTED)

Bay Area Rapid Transit District
800 Madison Avenue
Oakland, CA 94607
(415) 465-4100
Attention: Thaddeus Usewicz

Golden Gate Transit District
1011 Anderson Drive
San Rafael, CA 94903
(415) 457-3110
Attention: Alan Zahradnik

State Board of Equalization
350 McAllister Street
San Francisco, CA 94102
(415) 557-1877
Attention: James Moolring

San Francisco Building Owners and Managers Association
68 Post Street
San Francisco, CA 94104
(415) 362-8567
Attention: Scott Stephens

Golden Gate Disposal Company
900 7th-Street
San Francisco, CA 94107
(415) 626-4000
Attention: Fiore Garbarino

VIII. DISTRIBUTION LIST

FEDERAL AND STATE AGENCIES

Air Resources Board
1709 Eleventh Street
Sacramento, CA 95814
Attn: William Lockett

National Trust for Historic Preservation
Western Regional Office
681 Market Street
Suite 859
San Francisco, CA 94105
Attn: Hisashi Bill Sugaya, Bradford Paul

State Office of Historic Preservation (2)
P.O. Box 2390
Sacramento, CA 95811
Attn: Dr. Knox Mellon
Janes P. Trynor
Eugene Itogawa

State Office of Intergovernmental Management (15)
State Clearinghouse
1400 Tenth Street
Sacramento, CA 95814

T. R. Lammers
Calif. Dept. of Transportation
P.O. Box 3366, Rincon Annex
San Francisco, CA 94119

REGIONAL AGENCIES

Association of Bay Area Governments
Hotel Claremont
Berkeley, CA 94705

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109
Attn: Ralph Meade

REGIONAL AGENCIES (continued)

Bay Area Rapid Transit District
800 Madison Street
Oakland, CA 94607

Golden Gate Bridge Highway and Transportation District
P.O. Box 9000, Presidio Station
San Francisco, CA 94129

Metropolitan Transportation Commission
Hotel Claremont
Berkeley, CA 94705

San Mateo County Transit District
400 South El Camino
San Mateo, CA 94402

CITY AND COUNTY OF SAN FRANCISCO

Mayor Dianne Feinstein
City Hall
San Francisco, CA 94102

Roger Boas
Chief Administrative Officer
289 City Hall
San Francisco, CA 94102

San Francisco Planning Commission
100 Larkin Street
San Francisco, CA 94102
Toby Rosenblatt
Charles Starbuck
Ina Dearman
Susan Bierman
Joseph Mignola
Yoshio Nakashima
Richard Sklar
John Christensen

Landmarks Preservation Advisory Board
100 Larkin Street
San Francisco, CA 94102
Mrs. G. Bland Platt
Patrick McGrew
Elizabeth De Losada
Sally B. Famarin
Phillip Choy
Jean E. Kortum
Stewart Morton
Albert Lanier
John Ritchie

CITY AND COUNTY OF SAN FRANCISCO (continued)

San Francisco Department of Public Works
City Hall, Room 359
San Francisco, CA 94102
Attn: Jeffrey Lee, Director

Bureau of Building Inspection
450 McAllister Street
San Francisco, CA 94102
Attn: Robert Levy,
Superintendent

Bureau of Sanitary Engineering
770 Golden Gate Avenue
San Francisco, CA 94102
Attn: Thomas Landers,
Managing Engineer, Wastewater

Public Utilities Commission
946 Presidio Avenue
San Francisco, CA 94115
Attn: John Wentz

Committee for Utility Liaison on Construction and Other Projects
c/o GES - Utility Liaison
363 City Hall
San Francisco, CA 94102
Attn: Herman Beneke

San Francisco Police Department
850 Bryant Street
San Francisco, CA 94103
Attn: Charles Gain, Chief

Municipal Railway (MUNI)
949 Presideo
San Francisco, CA 94115
Attn: Peter Straus

GROUPS AND INDIVIDUALS

Junior Chamber of Commerce
270 Sutter Street
San Francisco, CA 94104

Northern California Chapter AIA
790 Market Street
San Francisco, CA 94102

GROUPS AND INDIVIDUALS (continued)

San Francisco Planning and Urban Renewal Association
126 Post Street
San Francisco, CA 94109
Attn: John H. Jacobs,
Executive Director

Sierra Club
530 Bush Street
San Francisco, CA 94108
Attn: Becky Evans

Women's Chamber of Commerce
681 Market St., Room 922
San Francisco, CA 94105

Christopher Curry
655 Corbett Street, #503
San Francisco, CA 94114

San Francisco Beautiful
41 Sutter Street
San Francisco, CA 94104
Attn: Mrs. H. Klussmann, President

San Francisco Chamber of Commerce
400 Montgomery Street
San Francisco, CA 94104
Attn: Richard Morten
Joe Castrovince
William Dauer

Rita Giglio
343 Texas Street
San Francisco, CA 94107

Bob Tibbetts
9 First Street, Rm. 826
San Francisco, CA 94105

Downtown Association
582 Market Street
San Francisco, CA 94104
Attn: Lloyd Pflueger, Manager

MEDIA

KGO, Channel 7 (ABC)
277 Golden Gate Avenue
San Francisco, CA 94102
Attn: Robert A. Sunderland

KPIX, Channel 5 (CBS)
2655 Van Ness Avenue
San Francisco, CA 94109
Attn: George Resting

KQED, Channel 9 (PBS)
500 Eighth Street
San Francisco, CA 94103

KRON, Channel 4 (NBC)
1001 Van Ness Avenue
San Francisco, CA 94109
Attn: Paul Wischmeyer
Herb Levy

San Francisco Bay Guardian
2700 Nineteenth Street
San Francisco, CA 94110
Attn: Patrick Douglas
City Editor

San Francisco Chronicle
925 Mission Street
San Francisco, CA 94103
Attn: Dale Champion and
Allan Temko

San Francisco Chronicle
2459 Pacific Avenue
San Francisco, CA 94115
Attn: Herb Caen and
Carol Vernier

San Francisco Examiner
110 Fifth Avenue
San Francisco, CA 94103
Attn: Don Cantor and
Gerald Adams

San Francisco Progress
851 Howard Street
San Francisco, CA 94103
Attn: Dan Borsuk and
Mark Elliot

The Sun Reporter
1366 Turk Street
San Francisco, CA 94115

LIBRARIES

Documents Department
City Library, Civic Center
San Francisco, CA 94102
Attn: Faith Van Liere

Environmental Protection
Agency Library
215 Fremont Street
San Francisco, CA 94105
Attn: Jean Circiello

Government Documents Station
Stanford University
Stanford, CA 94305

Government Publication Department
San Francisco State University
1630 Holloway Avenue, S.F., CA 94132

Hastings College of the Law Library
198 McAllister Street
San Francisco, CA 94102

IX. BIBLIOGRAPHY

Association of Bay Area Governments, Draft Environmental Management Plan, December 1977.

Bay Area Air Pollution Control District, Contaminant and Weather Summary, December 1976.

Bay Area Air Pollution Control District, Emissions Inventory Summary Report, August 1976.

Bay Area Air Pollution Control District, Guidelines for the Air Quality Impact Analysis of Projects, June 1975.

Bay Area Rapid Transit District, Patronage Reports for February-March 1978, Office of Research, Nos. 64-68, 1978.

California Air Resources Board, California Air Quality Data, Annual Summary, vol. IX, 1978.

California Department of Transportation, Tenth Progress Report on Trip Ends Generation, June 1976.

California Solid Waste Management Board, Solid Waste Generation Factors in California, Bulletin No. 2, Technical Information Services, July 1974.

Harding-Lawson Associates, Foundation Investigation Pacific Gateway Building, San Francisco, No. 3343,022.04, 1978.

Harding-Lawson Associates, Seismicity Study Dynamic Response Analysis Pacific Gateway Office Building, No. 3343,002.04, 1978.

Highway Research Board, Highway Capacity, 1965.

Real Estate Research Council of N. California, Northern California Real Estate Research Report, vol. 29, no. 1, 1978.

San Francisco City Planning Commission and San Francisco Redevelopment Agency, Draft Environmental Impact Report, Yerba Buena Center, January 1978.

San Francisco Department of City Planning, Commercial Trends: Report Containing Background Information for the Commerce and Industry Element of the Comprehensive Plan of the City of San Francisco, July 1975.

San Francisco Department of City Planning, Draft Environmental Impact Report, Proposed 333 Market Street Buildings, EE 77.98, September 1977.

San Francisco Department of City Planning, Environmental Protection Element of the Comprehensive Plan of San Francisco, September 1974.

San Francisco Department of City Planning, Final Environmental Impact Report, 180 Montgomery Street Project, EE 76.167, July 1977.

San Francisco Department of City Planning, Final Environmental Impact Report, 444 Market Street, EE 74.253, 1975.

San Francisco Department of City Planning, A Proposal for Citizen Review Communtiy Safety Plan for the Comprehensive Plan of San Francisco, July 1974.

San Francisco Department of City Planning, Urban Design Element of the Comprehensive Plan of San Francisco, 1971.

San Francisco Planning and Urban Renewal Association, Impact of Intensive High Rise Development on San Francisco, 1975.

Wilbur Smith Associates, San Francisco MUNI Transportation Project, Planning, Operations and Marketing, 1977.

APPENDIX A.

Microclimate Impact Study on the

Proposed Pacific Gateway Building

San Francisco, California

February 1978

CONTENTS

		Page
I.	Introduction	104
II.	Summary	104
III.	Building and site description	105
IV.	Model and wind tunnel facilities	105
V.	Testing methodology	106
VI.	Test results and discussion	107
VII.	Shadow pattern analysis	109
VIII.	Mitigation measures	110
	Bibliography	111
	Figures 1-7	following page 112

I. INTRODUCTION

Architects, engineers, and city planners designing urban structures are limited by a lack of information on wind effects caused by the presence of these structures, such as discomfort for pedestrians and wind-caused mechanical problems with doors, windows, and ventilating systems. Once a structure is built, remedial measures (if they exist at all) are generally very expensive.

It is virtually impossible to anticipate, by analysis or intuition, the winds that will be caused by a structure since they are determined by very complex interactions of forces. Fortunately it is possible to predict the wind patterns and pressures around structures by testing scale models in a wind tunnel that can simulate natural winds near the ground. This allows the designer to foresee possible environmental and mechanical problems and alleviate them before the building is erected.

Data from wind tunnel tests can be combined with climatological data to analyze the effect of a proposed structure on pedestrians in terms of human comfort. The frequency distribution of wind strengths at pedestrian level, combined with temperature data and shadow patterns of the proposed structure and its surroundings, can be used to forecast comfort at pedestrian levels.

The research was conducted in two phases. The current wind environment of the site was measured in Phase 1. The impact on the wind environment caused by construction of the proposed building was evaluated in Phase 2.

II. SUMMARY

A wind tunnel investigation was conducted on models of the site as it exists, and as it would exist with the proposed building. In addition, a shadow-pattern analysis was conducted.

The study results indicate that wind velocities in the project vicinity under existing conditions are generally low, as a

result of upwind urbanization; for this reason, construction of the proposed highrise would have little effect on the wind regime at the site. No wind problems related to either the existing site or the proposed project were identified. Shadow pattern diagrams were prepared for the proposed highrise; these indicated a decrease in sunshine to areas north of the project along Main and Mission Streets. The open area between the proposed highrise and Beale Street would not be affected by any building shadow patterns. When combined with the tree planting proposed by the developer, this area would be very suitable for sustained pedestrian use. The area immediately north of the project site between the highrise and Main Street would experience higher wind velocities and would be in shadow virtually all the time; this area would be generally uncomfortable for any long-term pedestrian use.

III. BUILDING AND SITE DESCRIPTION

The Gateway Plaza site is a triangular piece of property bounded by Mission and Howard Streets, and by the ramps of the Bayshore-Bay Bridge freeway. An office building of approximately equal height to the one proposed is located directly across from the site on Mission Street.

Surrounding buildings to the north, south, and east of the project are generally low; however, highrise development exists to the west of the site, the direction from which predominant winds flow.

Primiani-Weaver Architects have prepared plans for a 442-foot-high office building, approximately 142 feet on a side, on the site. Some tree planting is proposed on the north and south sides of the building (see Figure 1).

IV. MODEL AND WIND TUNNEL FACILITIES

Model

A scale model of the proposed building and nearby structures was constructed of polystyrene and urethane foams, using blueline prints supplied by the architect. A model of the structures surrounding the area, for a distance of several blocks, was constructed of polystyrene and urethane foams.

The model scale was one inch equals 30 feet. The model of the surrounding city area was built to this scale with building configurations and heights obtained from the Sanborn maps at the San Francisco Department of City Planning.

Wind Tunnel Facilities

The Environmental Impact Planning Corporation boundary layer wind tunnel was designed specifically for testing architectural models. The working section is 7 feet wide, 43 feet long, and 5 feet high. Wind velocities in the tunnel can be varied from 3.5 mph to 13 mph. The flow characteristics around sharp-edged objects, such as architectural models, are constant over the entire speed range. Low speeds are used for photographing tracer smoke, high speeds for windspeed measurements.

Simulation of natural wind characteristics is facilitated by an arrangement of turbulence generators and roughness upwind of the test section. These allow ajustments in wind characteristics to provide for different scale models and varying terrain upwind of the project site.

Measurements of windspeed around the model are made with a hot-wire anemometer, a device that relates the cooling effect of the wind on a heated wire to the actual windspeed. The flow above the city is measured by a Pitot tube connected to a micromanometer. The Pitot tube and micromanometer measure directly the pressure difference between moving and still air. This pressure difference is then related to the actual windspeed. Flow visualization is achieved by use of floodlit smoke in conjunction with a 35-mm. camera.

V. TESTING METHODOLOGY

Simulation of Flow

The most important factor in assuring similarity between flow around a model in a wind tunnel and flow around the actual building are the structure of the approach flow and the geometric similarity between the model and the prototype. A theoretical discussion of the exact criteria for similarity is not included in this paper, but may be found elsewhere (Cermak 1966, or Cermak and Arya, 1970).

The variation of windspeed with height (wind profile) was adjusted for the scale of the model and the type of terrain upwind of the site. The profiles used were those generally accepted as adequately describing the flow over that type of terrain (Lloyd 1967).

Testing Procedure

The windflow characteristics of the site in its present site were investigated to ascertain the present wind environment. Windspeeds and wind directions at specified points throughout the site were measured and recorded. Wind direction was measured by releasing smoke at each point and recording the direction in which the smoke traveled. Windspeed measurements were made at the same points, at a scale height of five feet above the ground. A hot-wire anemometer probe is required to make these measurements within a fraction of an inch of the model surfaces. The probe is repeatedly calibrated against the absolute reading of a Pitot tube and micromanometer. Velocity readings close to the model are generally accurate to within 10% of the true velocity.

A similar technique was used to measure the wind environment with the proposed building in place. Measurements were taken around the building and on the adjacent streets.

Before and after each test run, a calibration measurement was made above the model. The purpose of these measurements was to relate the wind tunnel measurements to actual wind records from U.S. Weather Service wind instrumentation located on the Federal Building at 50 Fulton Street.

VI. TEST RESULTS AND DISCUSSION

Tests of windspeed and wind direction were conducted for the two most frequent wind directions.

Measured windspeeds are expressed as percentages of the calibration windspeed, which corresponds to the actual windspeed at the San Francisco Weather Station. Thus, a plotted value of 52 means that the measured windspeed is expected to be 52% of the windspeed recorded by the Weather Service when winds are from that particular direction.

The plotted values can be interpreted in terms of general "windiness" using the scale below. This scale is subjective and is based on information gathered from similar studies in San Francisco.

Velocity	Percentage of calibration windspeed
Low	0 - 0.19
Moderately low	0.20 - 0.29
Moderate	0.30 - 0.49
Moderately high	0.50 - 0.69
High	0.70 - 1.00
Very high	>1.00

It should be noted that the plotted values are not actual windspeeds, but ratios. Thus, a point having a "very high" windspeed would still experience light winds on a near-calm day. Likewise, a point found to have "low" winds could experience significant winds on a windy day.

Wind direction is indicated by an arrow pointing in the direction of flow. Where wind direction fluctuated, two arrows representing the principal flow directions were plotted. Areas of fluctuating winds are normally turbulent, as are areas of spiraling motion; the latter are denoted by curved arrows.

Northwest Wind

Northwest winds occur 12 to 39% of the time in San Francisco, depending on the season. (In meteorology, a northwest wind blows from the northwest.) Northwesterly and westerly winds are the most frequent and the strongest winds at all seasons in San Francisco. Northwest winds exceed 13 miles per hour (mph) 35% of the time and 25 mph 3% of the time in summer. Wind frequencies and speeds are lower in spring, fall, and winter.

The site is protected from northwest winds by the existing upland highrise of approximately the same height as the proposed building. This existing highrise results in generally turbulent wind flows across the site under existing conditions (see Figure 1). Because of the particular urban configuration in the general vicinity of the proposed project, actual winds across the site tend to come from a more northerly direction when the overall wind is out of the northwest. Wind velocities at the site are generally low as a result of upwind urban development. Although the proposed development would alter the actual wind velocities at various points on the project site, the overall winds would remain low to moderate (see Figure 2). Wind velocities would increase slightly along the sides of the buildings parallel to Main and Beale Streets; windspeeds directly behind the building would be reduced and would become more turbulent in direction. (It should be noted that the model tested in the wind tunnel did not include the trees and shrubbery proposed by the developer and shown on the schematic drawing of the proposed site.) Windspeeds parallel to the southern side of Beale Street would tend to increase; however, they would still remain in the low velocity range.

West Wind

West winds occur between 15 and 40% of the time, depending on the season. They exceed 13 mph 29% of the time and 25 mph 7% of the time in summer. Wind strengths and frequencies are somewhat lower in spring, fall, and winter.

Figure 3 shows the current wind environment near the site under the conditions of a westerly wind. Velocities are low. Winds are turbulent, particuarly on the southern portion of the site. The wind environment resulting from the proposed building is shown in Figure 4. The existing wind regime would be almost entirely unaffected by the proposed building, with little change in either the velocity or the direction of winds across the site.

VII. SHADOW-PATTERN ANALYSIS

A. ELEMENTS OF COMFORT IN SAN FRANCISCO

The elements that influence comfort are temperature, humidity, sunshine, precipitation, and wind. Their relative importance varies with geographic location and the characteristics of the local climate. For the San Francisco region, the most important factors are temperature, solar radiation, and wind.

Temperatures in San Francisco are moderate owing to the influence of marine air. Temperatures are highest in fall and lowest in winter; both spring and summer are normally cool, with a high frequency of low clouds and fog.

The intensity and frequency of sunshine are normally integrated into a single figure and expressed as "percentage of possible sunshine." San Francisco has two peak periods of sunshine, in April and September. These months normally correspond to the transition periods between the strong marine airflow of summer and the transient storms of winter.

Wind in San Francisco is strongest in late spring and throughout the summer months, and lightest in winter. Summer winds have a large daily variation, with light winds during night and morning hours and peak winds in the afternoon. Westerly winds are dominant in all months but December and January.

B. SUN-SHADE PATTERNS

As there is no building presently on the site, the proposed highrise would substantially affect shadow patterns in the local vicinity. Sun-shade diagrams were prepared for each phase of the project at 1:00 p.m. (lunch time) for the first day of each season; the results of this analysis are shown in Figures 5 through 8. Areas northwest of the project, including portions of Mission and Main Streets and the lowrise buildings immediately east of Main Street, would receive less sunshine than under present conditions, particularly during fall and spring seasons. Because the existing buildings on the west side of Beale Street are relatively low, the open area immediately west of the

proposed highrise would remain sunny all year, in conjunction with the low windspeeds predicated for this area, as shown in Figure 2, and the tree planting proposed by developer, this area should be comfortable for pedestrian use.

On the other hand, the areas adjacent to the northeastern side of the building would usually be in the shade and would have a higher resultant wind velocity. Such areas would probably receive little sustained pedestrian use.

VIII. MITIGATION MEASURES

There are two types of mitigating measures for wind. The first is to make major design changes to reduce winds near the project, such as different building orientations or changes in size or shape.

The second type of mitigation measure involves additions to the project that would provide local shelter for pedestrians. Small structures such as kiosks for newspaper or flower vendors, telephone booths, and shelters at bus stops can serve in this way. Similarly, street trees and other vegetation can function as windbreaks.

As both the existing and proposed wind conditions at the site would result in generally low wind velocities, significant mitigation measures would not be required; the provision of trees along the sides of the building parallel to Beale and Main Streets would help reduce wind velocities in these areas. These trees would be particularly beneficial in providing a pleasant microclimate for the open area of the project south of the building, adjacent to Beale Street. A wind reduction on the order of 10% could be anticipated.

BIBLIOGRAPHY

Arens, E. A. 1972. "Climatic factor in planning and environmental design." Ph.D. thesis, University of Edinburgh.

Cermak, J. E., et al. 1966. Simulation of atmospheric motion by wind tunnel flows. Colorado State University.

_____, and Arya, S. P. 1970. "Problems of atmospheric shear flows and their laboratory simulation." Journal of Boundary-Layer Meteorology, September 1, 40-60.

Lloyd, A. 1967. "The generation of shear flow in a wind tunnel." Quarterly Journal of the Royal Meteorological Society, 93 (395) 79-96.

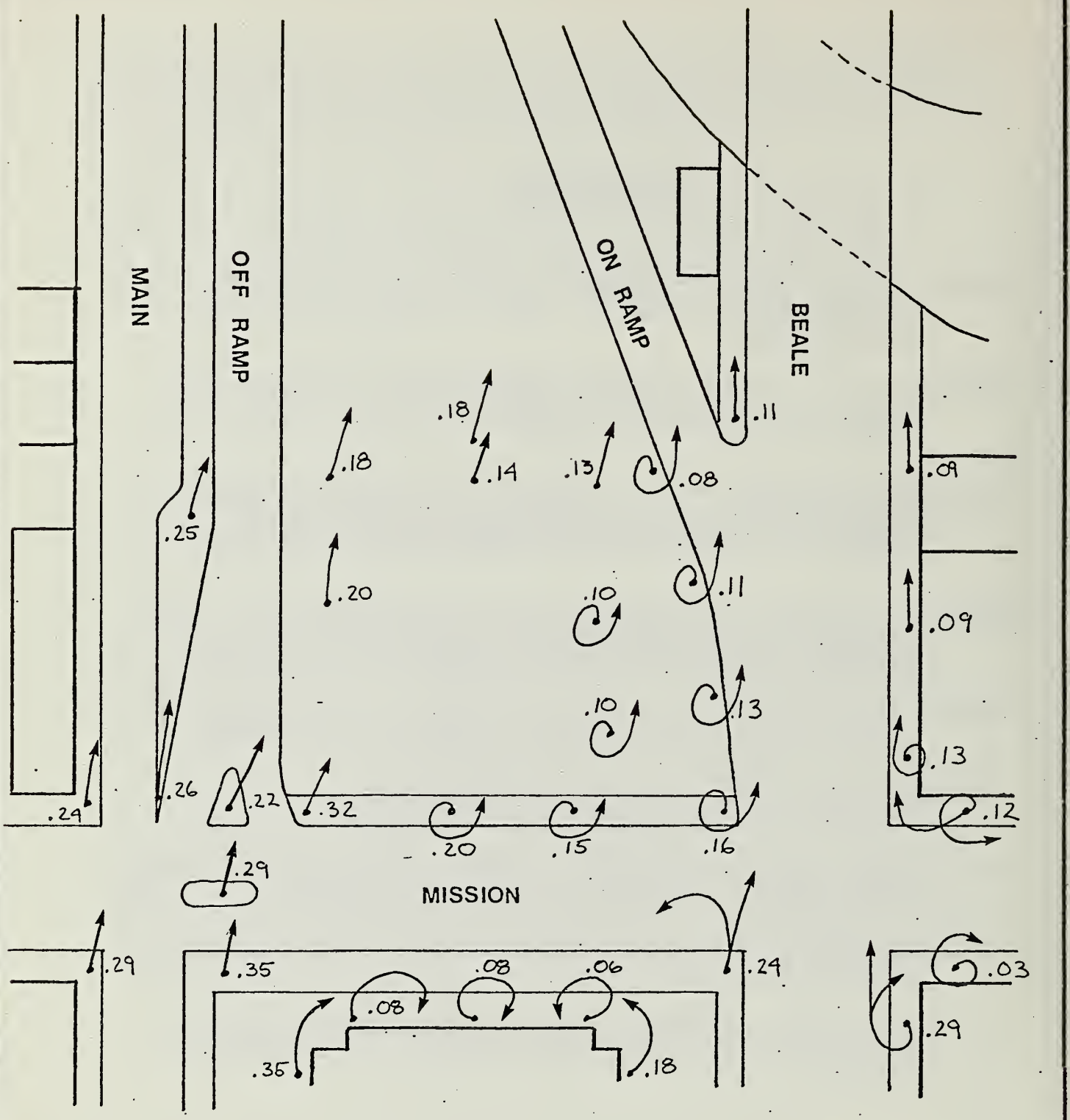
Pacific Gas and Electric Company. 1967. Mean hourly temperatures for Northern California.

Penwarden, A. 1973. "Acceptable windspeeds in towns." Journal of Building Science, 8, 259-267.

U. S. Department of Commerce. 1970a. Local climatological data, San Francisco International Airport.

_____. 1970b. Local climatological data, San Francisco Federal Building.

_____. 1968. Terminal forecasting reference manual, International Airport, San Francisco, California, October.

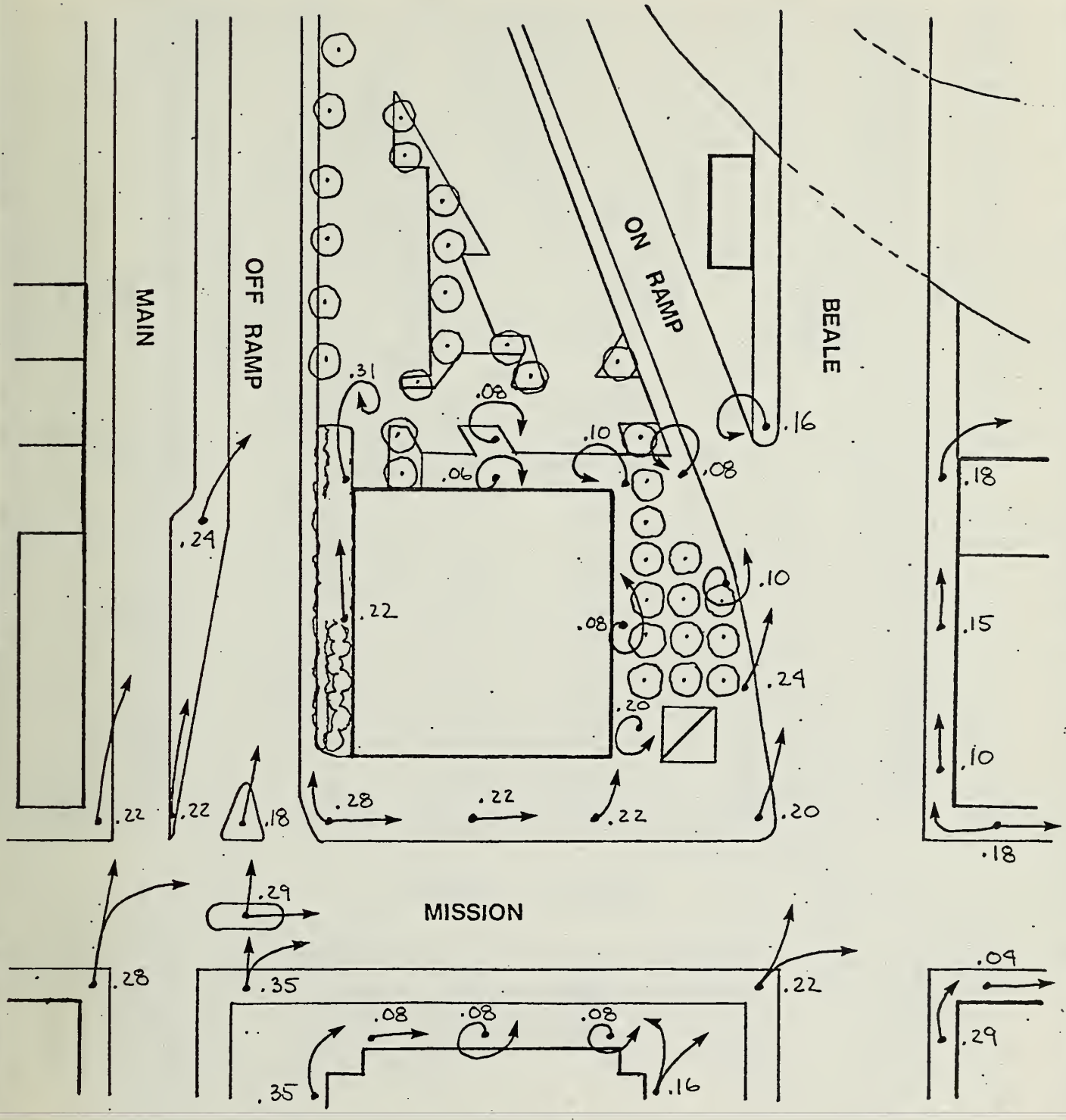


1"=80'

Existing Site - Wind Flow Patterns - Northwest

wind

FIGURE 1



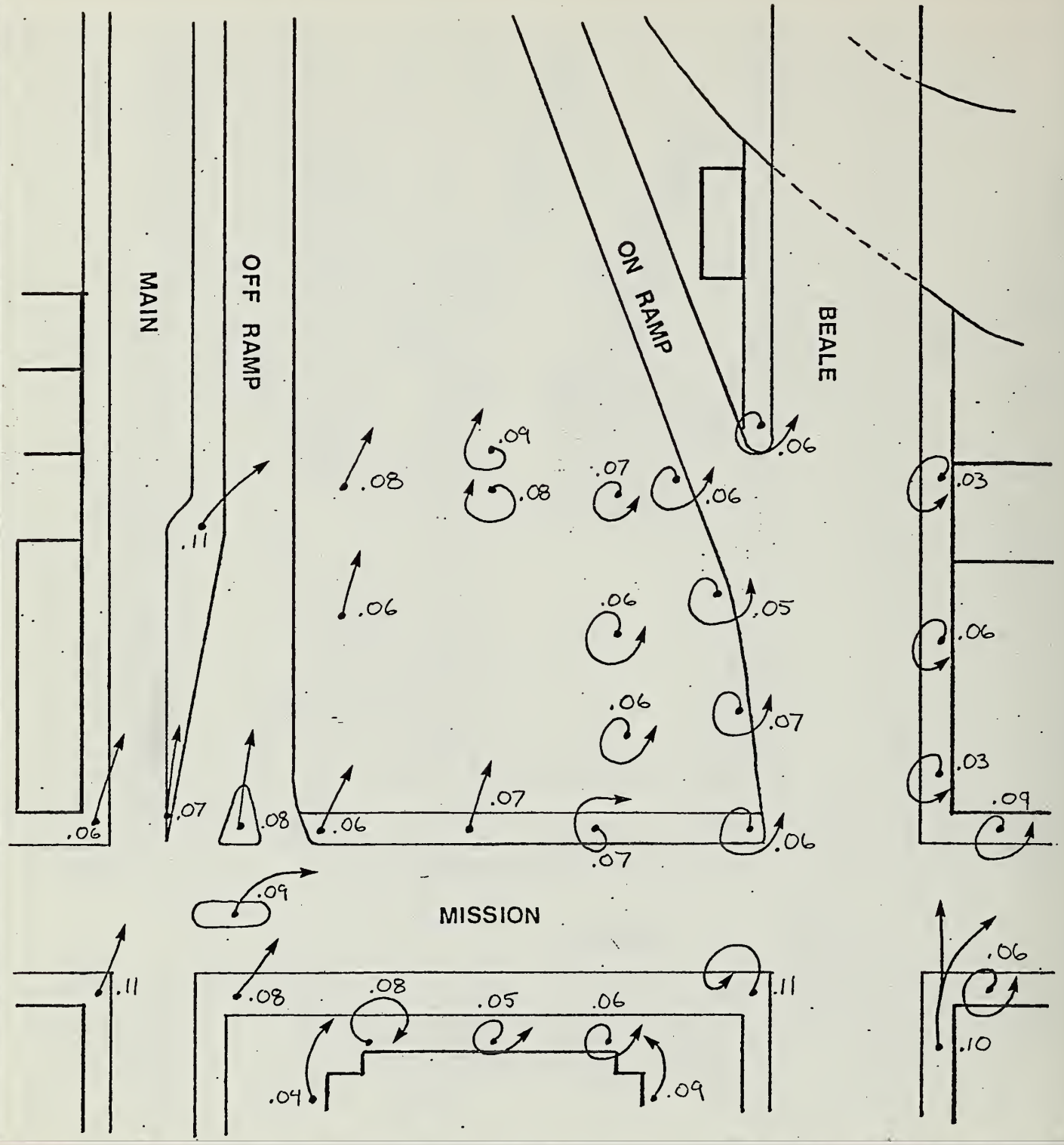
1"= 80'

N

Proposed Site · Wind Flow Patterns · Northwest

wind

FIGURE 2



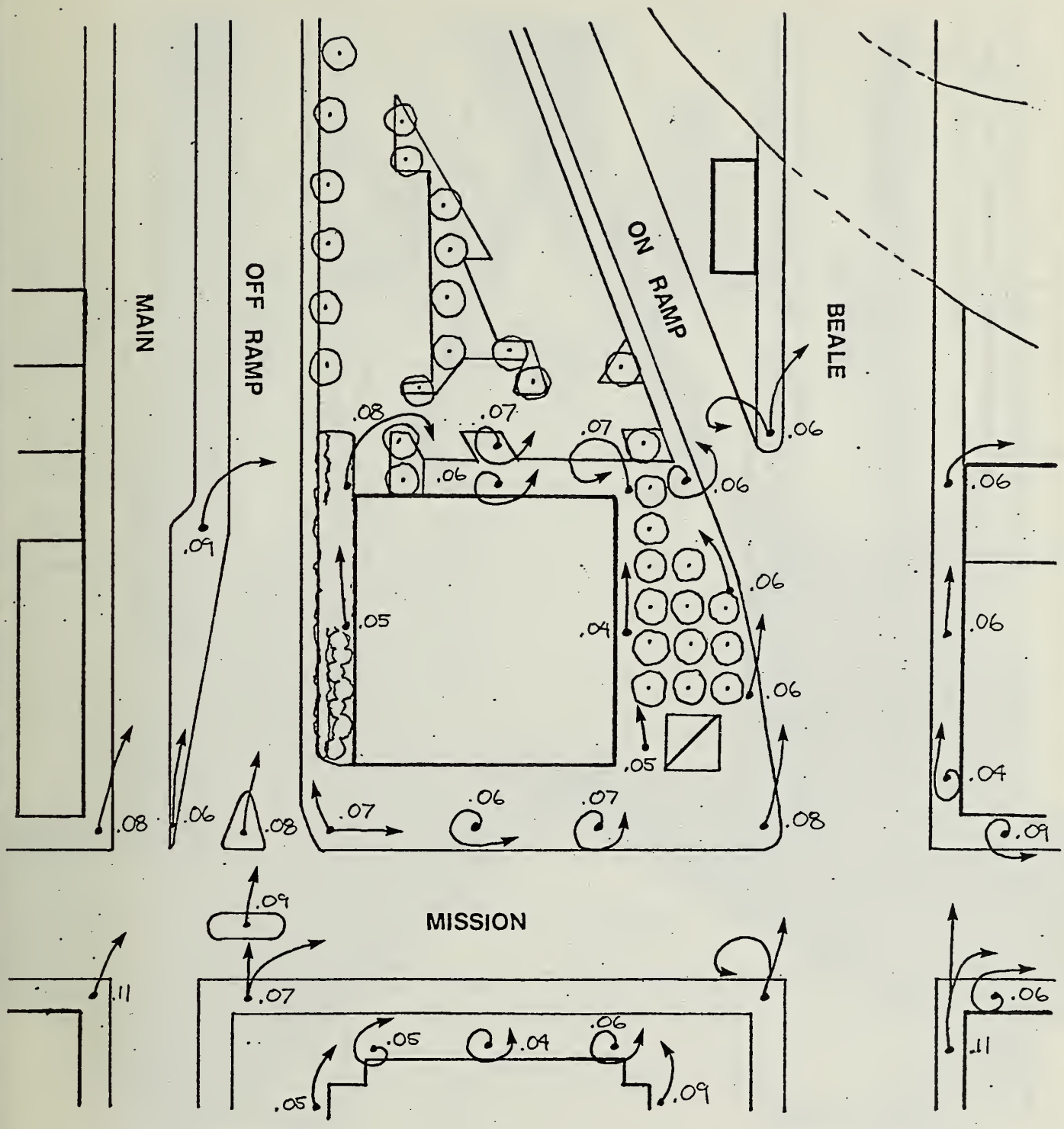
1" = 80'

Existing Site - Wind Flow Patterns - West

N

Wind

FIGURE 3

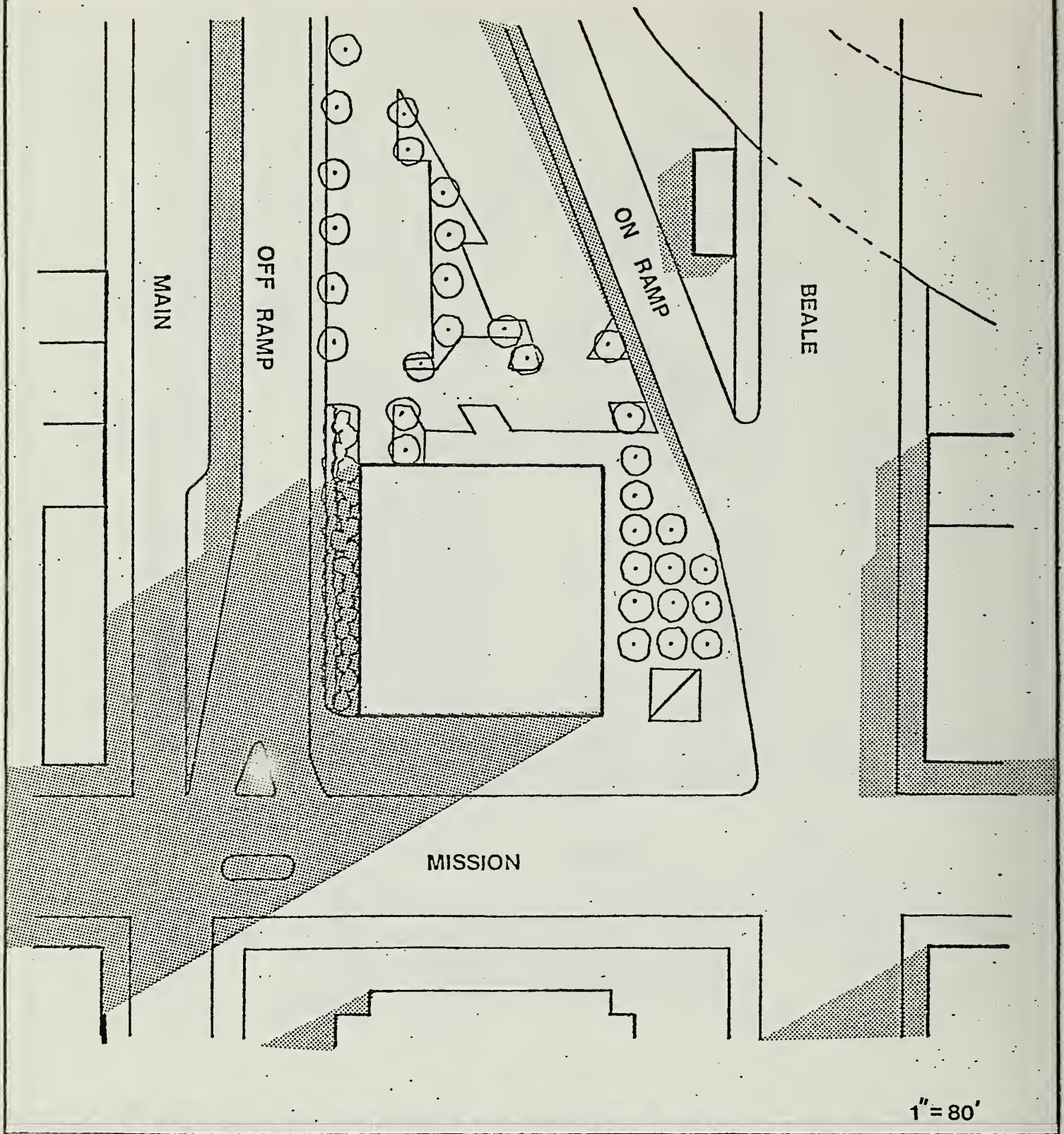


1" = 80'

Proposed Site · Wind Flow Patterns · West

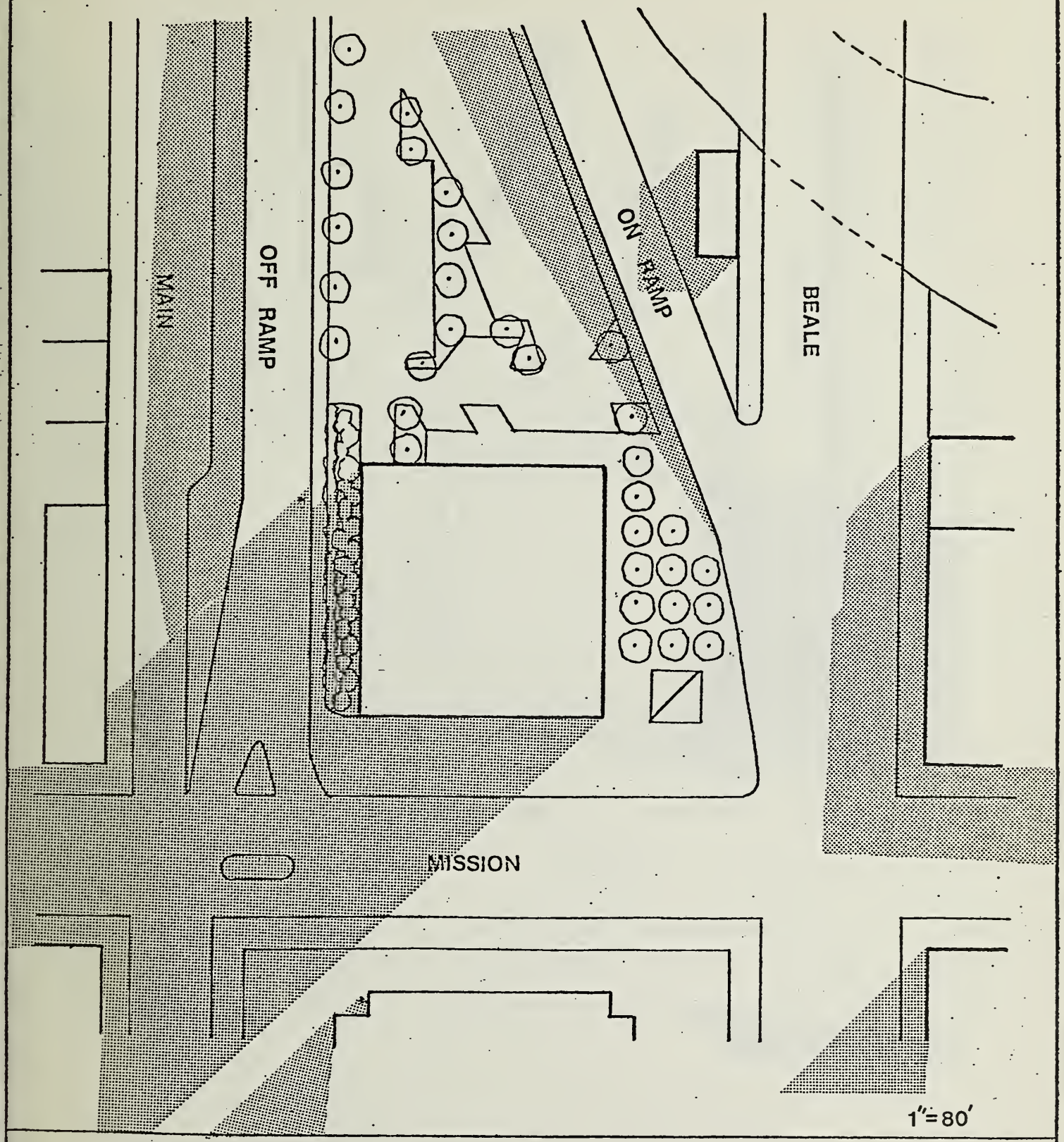
Wind

FIGURE 4



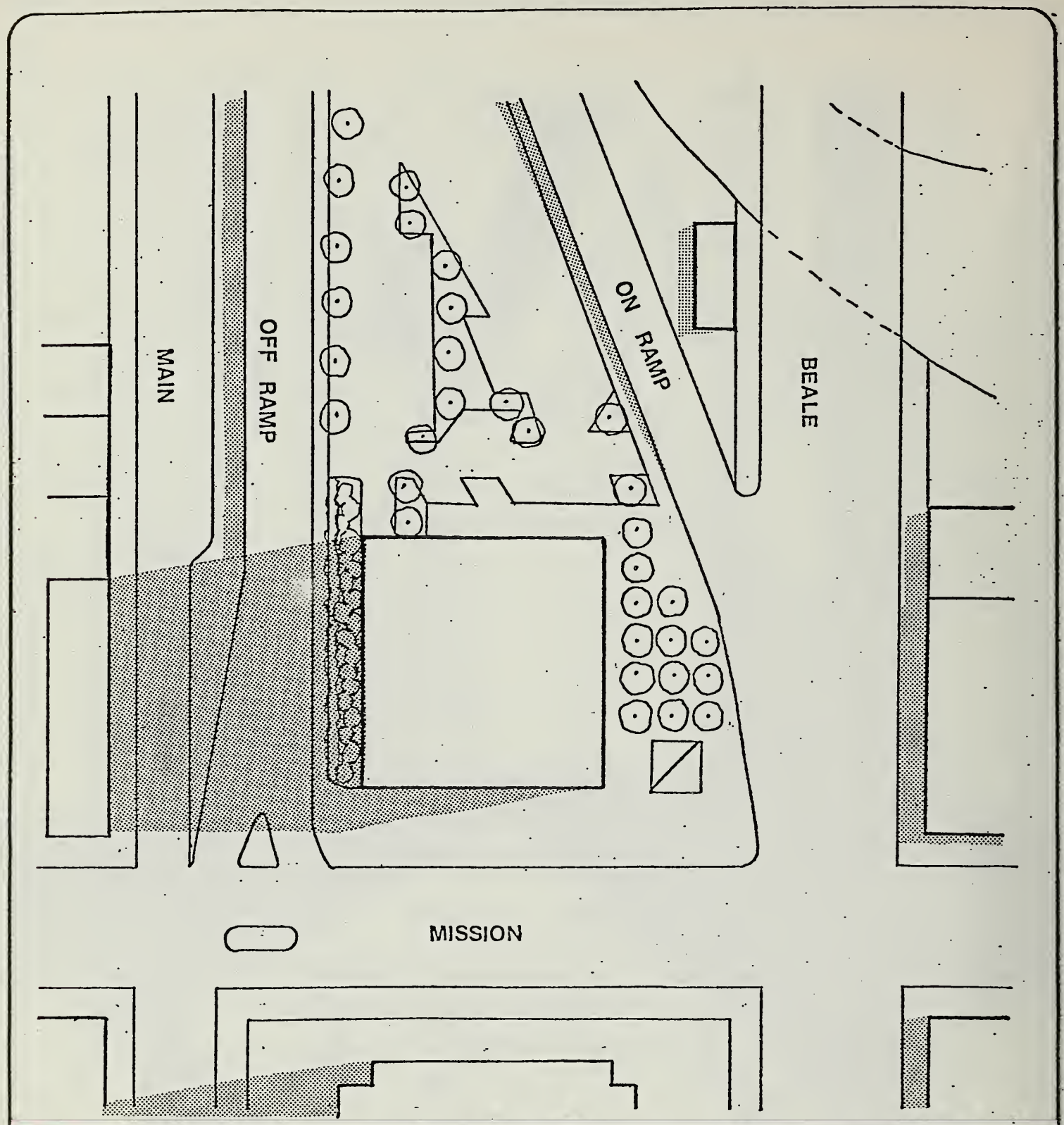
Proposed Site - Shadow Diagram Fall/Spring 1 PM

FIGURE 5



Proposed Site - Shadow Diagram Winter 1PM

FIGURE 6



1" = 80'

Proposed Site - Shadow Diagram Summer 1PM

FIGURE 7

TRAFFIC AND PEDESTRIAN IMPACT ANALYSIS
PACIFIC GATEWAY PROJECT

PREPARED BY:

BARTON-ASCHMAN ASSOCIATES, INC.

MARCH, 1979

ENVIRONMENTAL SETTING

A. Project Description

The proposed project would consist of a 33-story office building providing approximately 571,500 square feet of leasable space which would be comprised of approximately 564,000 square feet of office space and 7,550 square feet of bank/retail space (ground floor). It would be located on Mission Street between Beale and Main Streets on Assessor's Block 3718, Lot 26. The triangular lot spans the block, touching both Mission and Howard Streets. The office building would be located on Mission Street and vehicular access to the site provided from Howard Street. The Beale Street on-ramp to I-80 follows the west property line and the Main Street off-ramp from I-80 follows the east property line. The site is currently used for a parking lot. A two-level parking garage, with approximately 155 spaces reserved for tenants of the bUilding, would be provided behind the building, with access/egress onto Howard Street.

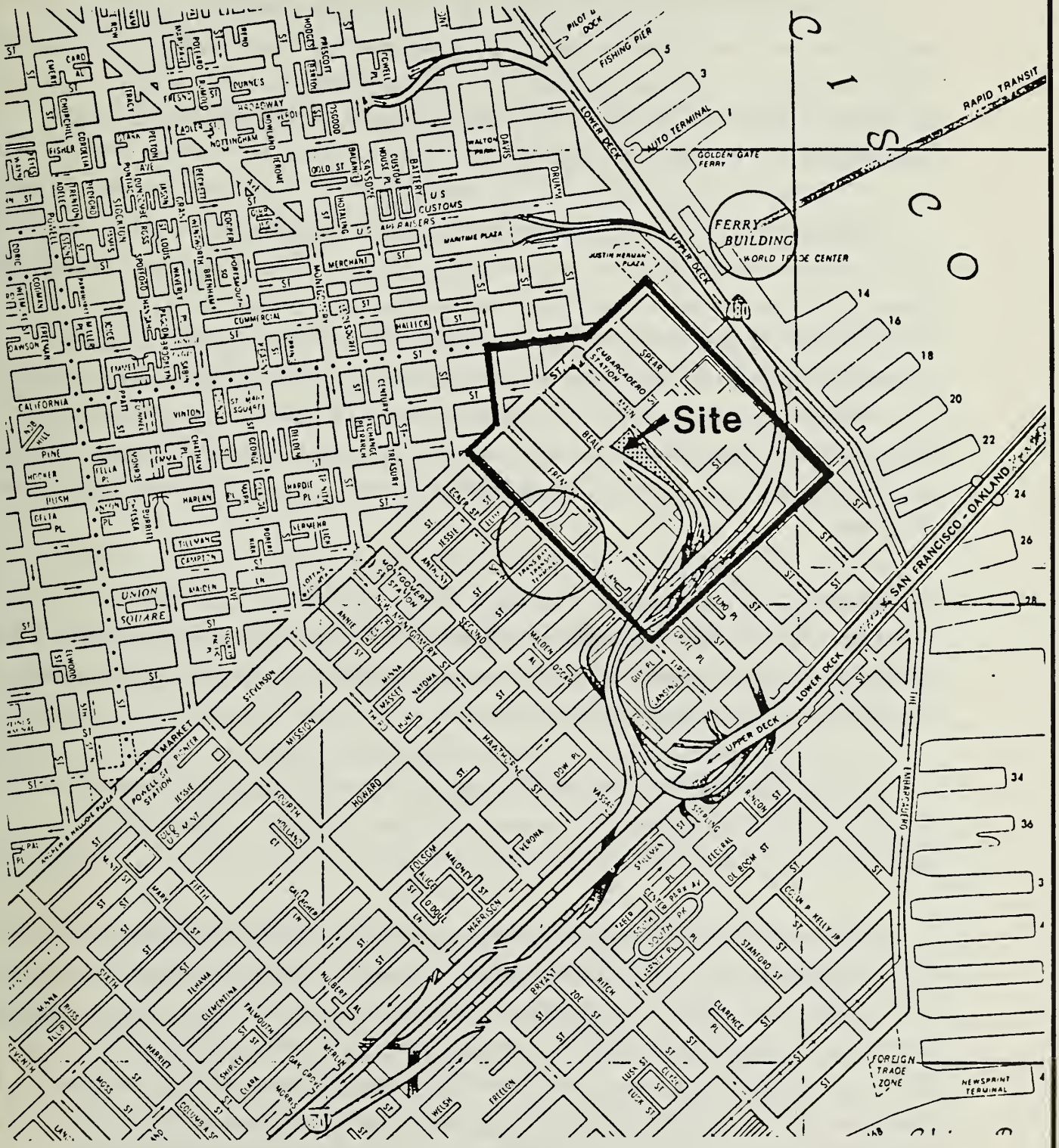
Figure 1 shows the location of the site and its relation to the San Francisco Financial District.

B. Existing Conditions

Street Network

This study will examine the area bounded by Market Street, Steuart Street, Folsom Street, First Street, Market Street, Front Street and California Street (Figure 2).

The area is fed by several freeway on- and off-ramps. Off-ramps from I-80 are located on Fremont and Main Streets at Mission Street. On-ramps are located on Beale Street adjacent to the site. An additional on-ramp to the Bay Bridge is located at First and Harrison Streets, just south of the project area. Off-ramps (southbound) and on-ramps (northbound) to The Embarcadero Freeway (Cal-480) are located on Fremont Street and on Beale Street (between Howard and Folsom) respectively. The locations of the freeway access points are shown in Figure 2.



Location Map

FIGURE 1

The Transportation Element of San Francisco's Comprehensive Plan designates Market, Howard, Folsom, Beale, Main and Spear Streets as major thoroughfares where major thoroughfare is defined as a "cross-town street whose primary function is to link districts within the City and to distribute traffic from and to the freeways; a route generally of citywide significance. . . ."

Market Street comprises a portion of the northern boundary of the study area and is a four-lane two-way street which has been classified as a Transit Preferential Street in the Transportation Element of the San Francisco Comprehensive Plan. Transit Preferential Street is defined as "streets where priority is given to transit vehicles over autos ...." Left turns from Market Street are prohibited on many streets such as Beale Street, Main Street and Fremont Street. Market Street has a 55-foot roadway and 35-foot sidewalks on each side of the street. The south-of-Market Streets in the study area have standard sidewalk widths of 10-15 feet and pavement widths 52-62 feet.

Mission Street is a two-way, four-lane street with the curb lanes (diamond lanes) reserved for buses and right turns from 7:00 a.m. to 6:00 p.m. The transit preferential diamond lane pair extends west from Main Street. Parking is prohibited between 4:00 and 6:00 p.m. on both sides of the street.

Howard Street is an east-west four-lane street that varies from two-way to one-way between First Street and Steuart Street (see Figure 2). Folsom Street is four lanes (eastbound) and forms the southern boundary of the study area.

First and Fremont Streets are a one-way pair that straddle the Transbay Terminal. First Street forms the west boundary of the study area, is one-way southbound and is four lanes. First Street is designated as a Transit Preferential Street in the Transportation Element. It is used for access to the Transbay Terminal between Market and Howard Streets. Fremont Street is a one-way, four-lane street northbound except between Folsom and Harrison Streets, where it is two-way. Fremont Street is also a Transit Preferential Street. The Transbay Terminal has direct access to Fremont Street between Howard and Mission Streets.

Beale and Main Streets are a one-way pair, each is four lanes north of Mission Street and three lanes south of Mission Street. Beale Street runs one-way southbound

and Main Street runs one-way northbound. Both are used during the peak-hours for access to/from I-80.

Spear Street is a two-lane one-way street southbound. Steuart Street is a two-way two-lane street which is controlled by stop signs. Between Market and Mission Streets, Steuart Street has been designated as a Transit Preferential Street as 11-MUNI bus routes use the block on the east side of the street as a turnaround and lay-over area.

Four other streets that fall within the study area are California, Front, Davis and Pine Streets (See Figure 2). California is a two-way Transit Preferential Street with a cable car line running along it. Front, Davis and Pine Streets are one-way streets with parking on both sides of the street. Parking is restricted during peak-hours. Front Street provides connection to Cal-480.

Table 1 gives traffic counts for streets within the study area for four periods of the day (7:00-9:00 a.m., 10:00 a.m.-3:00 p.m., 4:00-6:00 p.m. and 7:00 p.m.-6:00 a.m.) and 24-hour counts. Peak-hour capacities for these streets are included. The data was obtained from the San Francisco Department of Public Works; not all streets have representative counts. Market Street has not been counted since 8 October 1964 due to the consturction of BART and construction on Market Street within this area and because the streetcar tracks prevent taking machine traffic counts

Mass Transit

The project site is located in an area that has multiple access to mass transit. The following transit services are provided within the study area: San Francisco Municipal Railway (MUNI) provides bus and trolley service within 0 to 2 blocks of the site, the Embarcadero BART station is located on Market Street between Main and Beale Streets, AC Transit (East Bay), SamTrans (Peninsula) and Golden Gate Transit (North Bay) are accessible at the Transbay Terminal (two blocks). Ferry service is available between the Ferry Terminal (4-5 blocks to the northeast) and Larkspur, Tiburon and Sausalito. Southern Pacific has train service to the Peninsula, approximately 8 blocks or 1.5 miles from the project. Feeder service is provided by MUNI between Southern Pacific and the site by lines 80 and 27. Sam Trans serves the Peninsula; it took over these routes from Greyhound during 1977. Figures 2 and 3 show the location of these transit services in relation to the site.

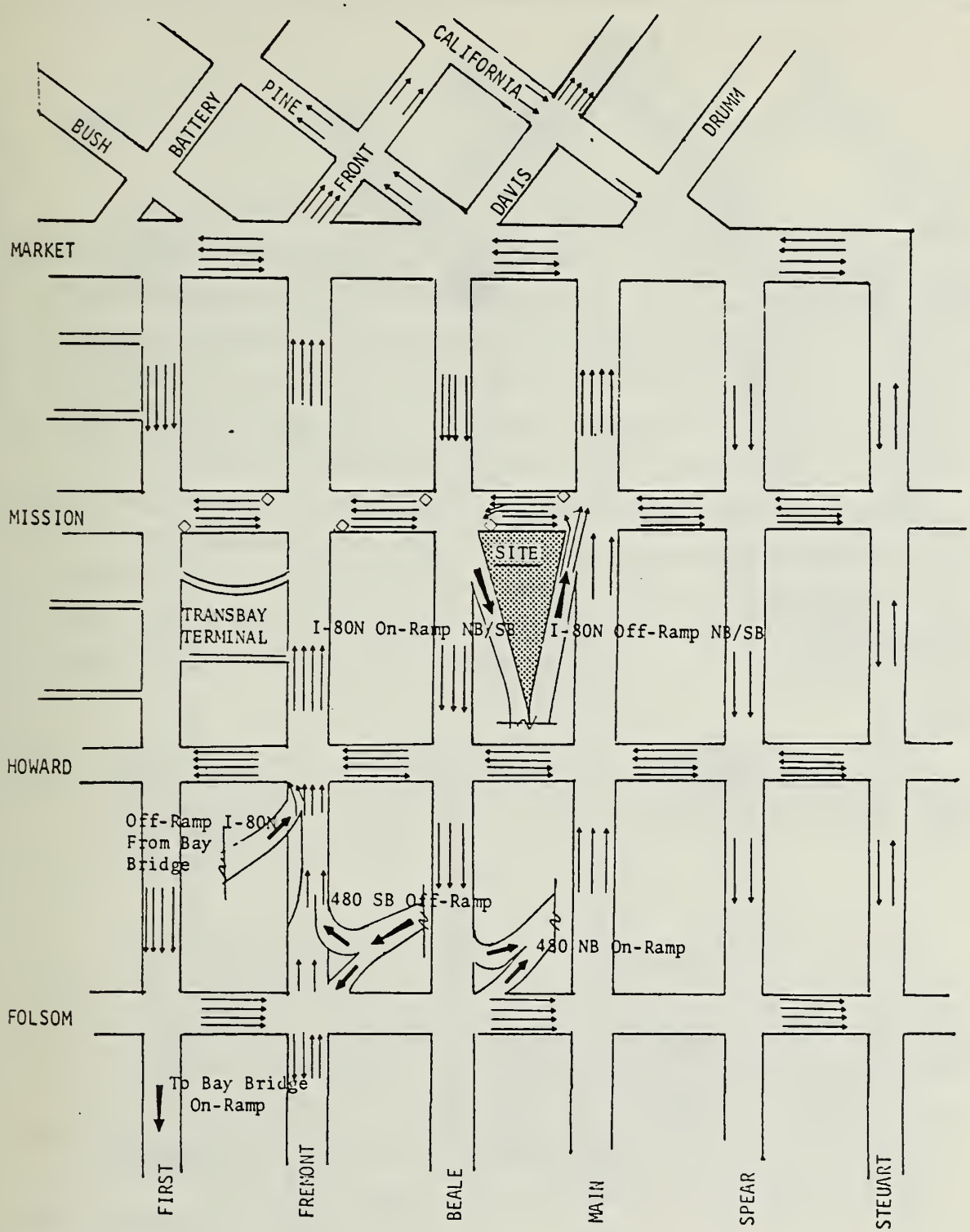
Table 1

TRAFFIC COUNTS[1] AND PEAK-HOUR CAPACITIES[2]

	7a.m.-9a.m.	10a.m.-3p.m.	4-6p.m.	7p.m.-6a.m.	24 hours	P.M. Peak 1-Hour Capacity
Main-So. Market 7/27/76	2,650	4,410	1,800	1,630	13,250	2,000
First-So. Market 2/27/76	1,620	3,460	2,130	1,890	11,610	2,000
Beale-So. Market 7/27/76	1,080	2,240	1,850	1,010	7,860	2,000
Fremont-So. Market 7/29/76	1,540	2,080	1,420	1,120	7,980	1,200
Mission-West of 4th 1/26/76						
eastbound	1,380	2,880	1,370	1,150	8,460	930
westbound	870	3,330	1,980	1,740	9,860	930
Howard						
west of 4th (1/17/77)	1,410	4,680	3,680	1,150	13,410	2,000
Folsom - West of 4th 1/27/76	3,050	4,690	2,140	980	13,600	2,000

1 Obtained from San Francisco Department of Public Works.

2 Assumes 10% turns, 10% co-mercial vehicles, 50% green time and a Level of Service 'C'. The 50% grean time assumption represents average conditions in a Central Business District.



Legend:

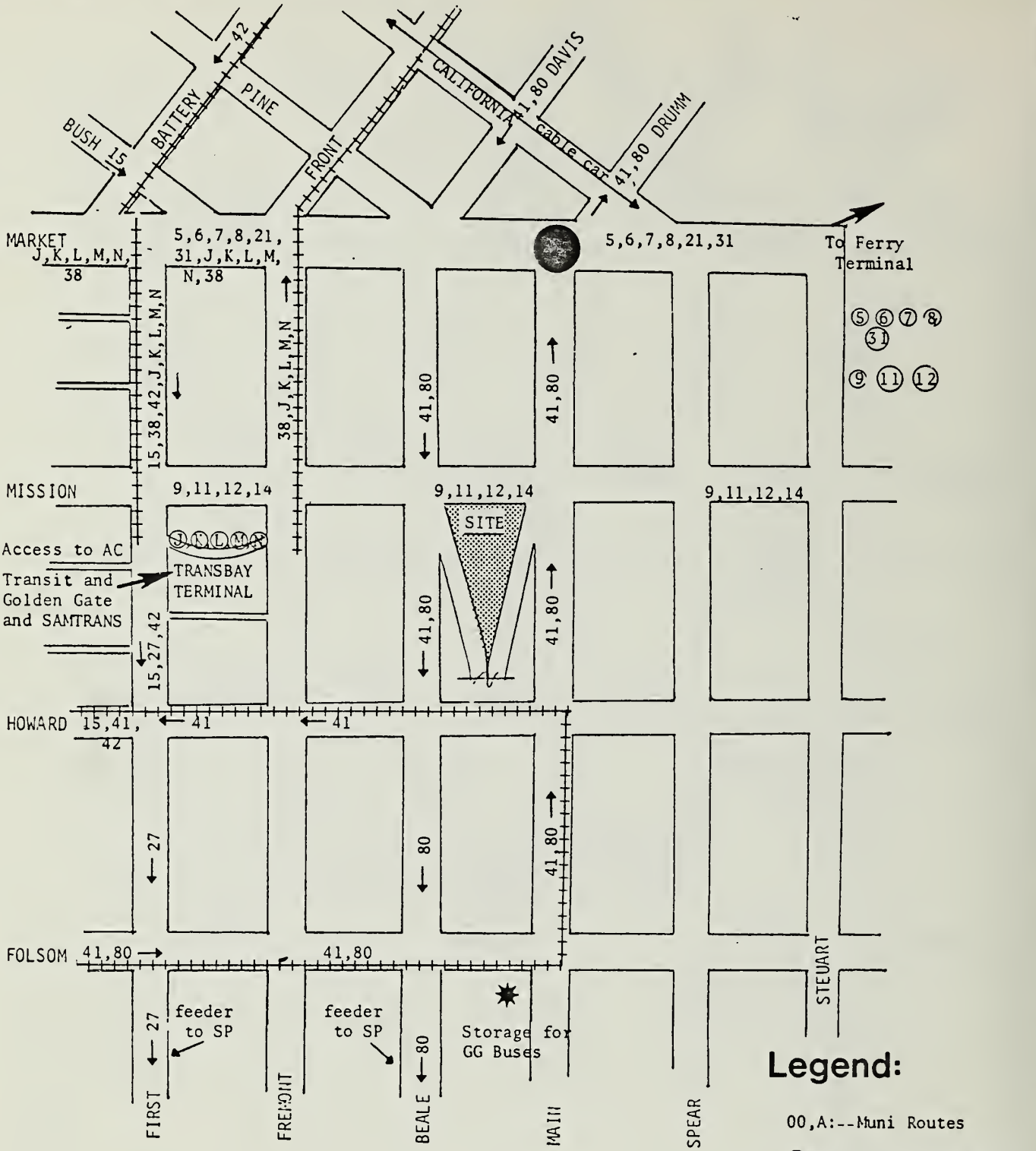
◇ Diamond Lane: Buses and Right Turns Only, 7am to 6pm
NB = Northbound
SB = Southbound
⟶ = Traffic Lane

Street Network

Not To Scale

N

FIGURE 2



Transit Routes

FIGURE 3

MUNI

There are 22 Municipal Railway bus routes and streetcar routes within 1-2 blocks of the site. There is also one cable car route along California Street that originates at California and Market Street. As Figure 3 shows, most of these routes follow either Market Street or Mission Street. All of the streetcar routes follow Market Street. Table 2 shows the headways and Table 3 shows the volumes and capacities of these lines. The volumes were taken by MUNI in 1976 at maximum load points along each route. This was the most recent data availabe from MUNI as the 1977 data had not yet been fully compiled. The numbers that appear in Table 3 represent actual counts as taken by MUNI over 1976 and have not been modified to show average loading characteristics. Three types of transit vehicles are used by MUNI. The seating and standing capacities of each type are shown below:

	Seated	Standees
Motor Coach	48	27
Trolley Coach	51	24
Street Car	55	35

When all seats are full and the number of standees equal those shown above, this condition is defined as a crush load by MUNI. That is, the maximum number of persons per vehicle that riders will generally put up with, which is approximately a 1.5 load factor. To a passenger, the load factor provides an indication of opportunity to sit while riding, the passenger space on board and the possibility of being passed by a vehicle with a crush standing load. Load factors of 1.5 or greater for peak 15-minute intervals are considered above designated service standards[1,2].

[1] S.F. Municipal Transportation Project. Planning, Operations and Marketing, Wilbur Smith and Assoc., Draft Final Report, June 1977.

[2] A load factor of 1.5 means all seats are taken and the aisle is full of half as many standees.

Table 2

HEADWAYS[1] (MINUTES) ON MUNI LINES SERVING PROJECT

	Line	6:00-8:00 a.m.[2]	8:00 a.m.-4:00 p.m.	4:00-6:00 p.m.	6:00 p.m.-midnight	1:00-5:00 a.m. (Owl)
Streetcars	J	5	7	5	12	30
	K	5	8	4	12	60
	L	4	8	4	12	60
	M	9	8	6	--	--
	N	3	6	4	12	30
Buses & Trolleys	5	4	7	3	--	--
	6	5	9	4	15	--
	7	11	8	6	15	--
	8	4	6	4	14	--
	9	10	17	11	--	--
	11	8	15	9	--	--
	12	8	8	7	13	--
	14	1	3	1	13	30
	15/42	4	12	8	16	--
	21	6	8	6	15	--
	27	15	20	15	30	--
	31	4	9	4	14	60
	38	3	4	2	10	30
	41	6	10	4	20	60
	80	7	--	9	--	--

[1] Most recent (as of January 1978) MUNI schedules.

[2] Assumes complete adherence to published schedules, that is, there are no missed trips.

Table 3

RIDERSHIP[1] ON MUNI LINES SERVING PROJECT

Line	7:00-9:00a.m.		10:00a.m.-2:00p.m.[2]	4:00-6:00p.m.		6:00-10:00p.m.	P.M. Peak Period One-Way Capacity[3]		Location Count Taken
J	1,545	(516)[4]	1,045	1,276	(437)*[4]	690	1,320	(330)[4]	Market/Van Ness
K	1,302	(396)	1,185	1,295	(471)	854	1,650	(415)	Market/Van Ness
L	1,664	(793)	1,135	1,853	(612)*	1,162	1,650	(415)	Market/Van Ness
M	841	(258)	1,194	966	(345)	213	1,100	(275)	Market/Van Ness
N	2,341	(715)	1,972	1,915	(667)**	1,164	1,650	(415)	Market/Van Ness
Sub-Total				7,335	(2,532)		7,370	(1,850)	
5	1,294	(442)	1,109	1,719	(706)*	570	1,920	(480)	McAllister/Van Ness
6	1,031	(402)	725	1,291	(437)	518	1,530	(385)	Market/11th
7	582	(199)	696	777	(311)*	352	1,020	(255)	Market/11th
8	1,124	(396)	806	1,758	(638)**	758	1,750	(435)	Market/11th
9	722	(307)	597	604	(204)**	75	560	(140)	Mission/16th
11	567	(184)	410	516	(211)*	38	640	(160)	Mission/16th
12	1,018	(278)	1,262	978	(280)	857	870	(220)	Mission/16th
14	2,298	(763)	1,401	2,819	(1,081)**	928	2,490	(620)	Mission/16th
15 so.	790	(373)	396	1,606	(576)	268	1,920	(480)	4th/Townsend
no.	904	(299)	718	972	(292)**	597	640	(160)	Columbus/Kearney
21	898	(268)	821	886	(299)*	623	1,020	(255)	Grove/Van Ness
27	373	(109)	131	327	(94)*	11	385	(95)	Bryant/16th
31	1,194	(377)	897	1,262	(401)	439	1,440	(360)	Eddy/Van Ness
38	1,471	(478)	2,422	2,444	(856)	1,294	2,880	(720)	O'Farrell/Powell
41	335	(121)	490	283	(124)	357	1,225	(305)	Union/Columbus
42	914	(277)	228	197	(55)	138	(included in 15)		4th/Townsend
Sub-Total				18,439	(6,565)		20,290	(5,070)	
TOTAL				25,774	(9,097)		27,660	(6,920)	

[1]One-way counts; taken in heaviest direction by MUNI in 1976

[2]10:00a.m.-2:00p.m. rather than 10:00a.m.-3:00p.m. was used because after 2:00p.m. counts taken in outbound direction; prior to 2:00p.m. counts taken in inbound direction.

[3]Capacity is defined using values provided on Page 7 and represent a load factor of 1.0.

[4]Peak 30 minutes during the peak period.

**Loading during peak 30 minutes is at or exceeds crush load (1.5 load factor)

*Loading during peak 30 minutes is within one missed trip of crush load conditions.

It should also be noted that the capacities were estimated using MUNI published schedules and do not take into account missed trips. San Francisco MUNI Transportation Project, Planning, Operations and Marketing, prepared by Wilbur Smith 1977, reported that the impact of missed trips on remaining scheduled service is to disrupt schedules and running times for trips immediately following the missed trip. This leads to a platooning or bunching of vehicles and increased passenger loads. To MUNI riders this results in longer waits, crowded buses, pass-bys and inconsistent travel times. Of the lines studied, missed trips ranged from 1.9 tO 4.2%. This non-adherence to schedules was not taken into account in this analysis but it can reduce the available capacity of transit in the study area.

Ridership on the streetcars during the evening peak period in the peak direction is approximately 7,300 with approximately 2,500 person trips occuring during the peak 30 minutes. The N line is currently experiencing crush load conditions and lines J and L are within one lost run of crush load conditions.

The existing peak period (4:00-6:00 p.m.) volumes in the peak direction on trolley coaches and motor coaches is approximately 18,400 persons; the volume during the peak 30-minute period is 6,565 persons. There is capacity available (one-way) for approximately 20,290 seated passengers and 10,380 standing passengers. During the peak 30 minutes lines 8, 9, 14 and 15 are at or exceed crush load conditIons and lines 5, 7 11, 21 and 27 are within one missed trip of crush load conditions.

The Metro, a portion of the MUNI, which will operate in the upper level of the Market Street Subway near the project, will include the five streetcar lines (J,K,L,M, and N). It is targeted to open in late 1979[1]. MUNI has estimated that there will be an increase in capacity of approximately 50% on the streetcars[1]. If the system is consistently reliable, this 50% increase should be realized. There is a proposed turnaround at the east terminus of the Metro that would

[1]Peter Straus, Transit Planner, MUNI, February 9, 1979.

cause the 50% increase to be more realistic and also provide the potential of increasing capacities which would require more cars. The effects of the turnaround were not included in the 50% estimate. However, because up to 10 minutes of travel time will be removed with the subway compared to surface buses, many persons now using the bus will transfer to the Metro. Because of the potential shift in ridership, a reductIon in capacity could be made on the trolley coach and the motor coach routes so the full 50% increase in capacity on Metro would not be experienced. It is unknown at this time what reduction would be[1]. The 50% increase assumes that the system will work as planned. Existing streetcar lines are nearing peak ridership in the peak 30 minutes. The N line is right at the capacity point. With the increase in capacity projected for MUNI Metro, load factors should be reduced to a more tolerable level.

Jitneys

There is independent jitney service that has a stop reserved for it from 7:00-9:00 a.m. on Mission Street across from the Transbay Terminal.

[1] Peter Straus, Transit Planner, MUNI, February 9, 1979.

BART

The project is one block from the BART Embarcadero station. BART operates from 6:00 a.m. to approximately 12:00 midnight, Monday through Saturday, Sunday service is available between 6:00 a.m. and 12 midnight. The Daly City/Richmond line should begin full service operations in late 1979 but this may be postponed because of the fire in the Transbay Tube[1]. Current ridership eastbound from the Embarcadero Station is approximately 16,000 during the peak period (4:00 - 6:00 p.m.).[2] Capacity during this period is 15,100 in one direction, assuming 10 cars per train and 13 trains per peak period on the Concord/Daily City line and an average of 8.5 cars per train and 10 trains per peak period on the Fremont/Daly City line and 70 persons per car (seated only). As with Muni, service disruptions reduce capacity and no reductions were incorporated in the capacity figure. The ridership of 16,000 represents an average load factor of 1.06 over the peak period assuming no disruptions to service. During the peak-halfhour this load factor is as much as 25% higher.[3]

Current ridership westbound from the Civic Center Station, which is the maximum load point, is approximately 10,900 during the peak period and capacity (70 seated passengers) is 15,100 in one direction which represents a load factor of 72 % during the peak-half hour this load factor is as much as 25% greater.[3]

[1] Alice McDonald, Bart Passenger Service, discussion February 9, 1979.

[2] BART Patronage Reports for February-March 1978, prepared by BART Office of Research, Report Nos. 65-68.

[3] Post AC Transit Strike Demand, estimates of peak period demands prepared by BART. Data provided by Thaddeus Usowicz, Capital Improvements Program Engineer, 28 June 1978.

Golden Gate Transit[1]

The project site is within two blocks of the Golden Gate Transit Financial District Commuter Routes, which operate out of the Transbay Terminal, and the Golden Gate Transit Civic Center Commuter Routes, which operate along Folsom Street (inbound) and Howard Street (outbound). Service on these routes is available between 6:30 and 9:00 a.m. (inbound) and 4:00-6:15 p.m. (outbound). Four routes operate throughout the day out of the Transbay Terminal. Current patronage during the peak period (4:00-6:00 p.m.) on the commute system out of San Francisco is approximately 7,250 passengers on 19 routes. The average load factor is .86 with a peak load factor of 1.06 on route number 36 which serves Terra Linda in Marin County. Capacity of the system is approximately 8,400 seats (outbound) during the peak period. During the peak-hour the load factor would be greater. The policy of Golden Gate Transit is to try to maintain a load factor of 1.0.

During the evening peak period 1 northbound trip is provided by the Sausalito Ferry with a capacity of 396 seats and 2 northbound trips are provided by the Larkspur Ferry with a total capacity of 1,010 seats. The resulting load factors are .50 on the Sausalito Ferry and .76 on the Larkspur Ferry.

[1] Information provided by Alan Zahradnik, Senior Planner, Golden Gate Transit in letter dated 6/23/78 based on Spril 1978 Monthly Summary Report (20 weekdays) and discussions on 6/22/78.

AC Transit[1]

AC Transit provides service between the East Bay and San Francisco at the Transbay Terminal at Mission and Fremont Streets. Service is provided throughout the day with special express service during the peak hours. During the peak period (4:00-6:00 p.m.) the Transbay ridership on AC Transit is approximately 12,600, which is at an average of 85 to 90% of available capacity during this period.

SamTrans[2]

SamTrans provides service between the Peninsula and San Francisco at the Transbay Terminal. Service is provided throughout the day. During May 1978 it had a total ridership of 360,000 of which 139,000 of the trips had origins or destinations in San Francisco. This included direct trunk line serice to BART. During the peak period approximately 900 persons were outbound from the Transbay Terminal and capacity was approximately 1,640 seats during this period which produces a load factor of .56.

Pedestrians

Pedestrian levels vary throughout the study area and during different periods of the day. The pedestrian volumes increase from south to north within the project area and are heaviest during the noon hour and the morning and evening rush hours. The heaviest volumes are located along Mission and Market Streets and along those cross-street sidewalks between Mission and Market Streets. These observations were made in January 1978 during the evening peak period (4:00-5:30 p.m.) and again in June 1978 from 4:30-5:30 p.m.

[1] Don Larson - AC Transit - 6/23/78, telephone conversation

[2] Larry Stueck - Sam Trans - 6/26/78, telephone conversation

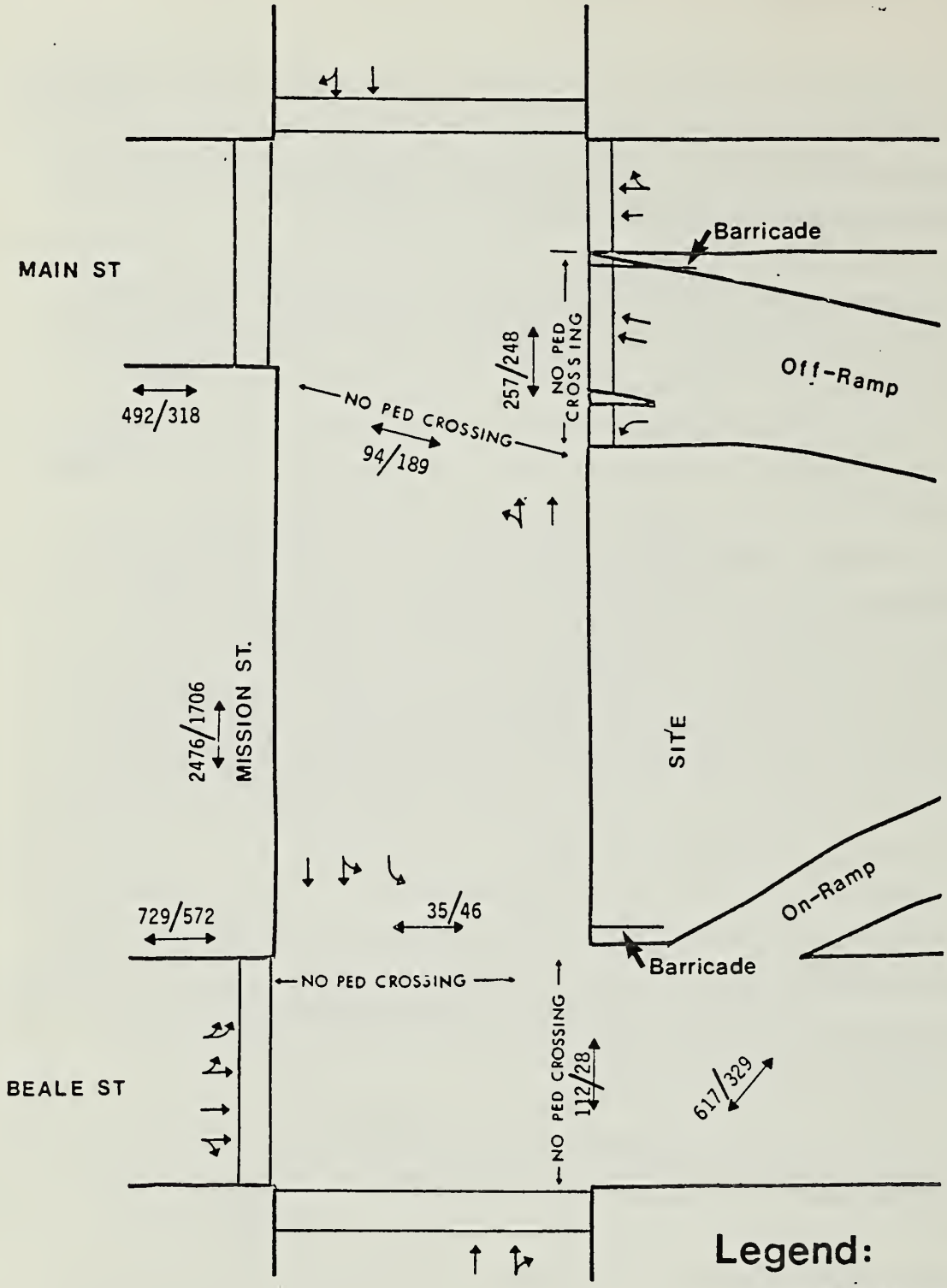
Pedestrian access to the site is from intersections along Howard Street. Pedestrian crossings to the project site are not allowed at the Mission/Beale Street and the Mission/Main Street intersections (Figure 4). However, pedestrians do cross at these locations, primarly to gain access to the parking lots located on the block.

There have been illegal pedestrian movements at the intersection of Beale and Mission Streets. To prevent interference of pedestrians with vehicles using the I-80 on-ramp, pedestrians have been prohibited from the south leg of Beale Street and the east leg of Mission Street (Figure 4). However, pedestrians do not appear to be complying with the regulation. A count was made on 23 September 1973 by the Department of Public Works, Bureau of Traffic Engineering between 4:00 and 5:30 p.m. at the Beale Street/Mission Street intersection. These counts were updated by Barton-Aschman Associates on 22 June 1978 and additional locations were also counted. The results are shown in Figure 4. The total number of persons crossing illegally during the evening peak period had not changed by a significant amount (less than 5%) but the distribution on the legs of the Beale/Mission intersection had changed. There was one sign to indicate that these crossings were not allowed. The sign was on a small barrier across the Mission Street sidewalk and was located in the southeast corner of the Beale and Mission Street intersection. It indicated that crossing Beale Street was not allowed and said "no ped crossing/use crosswalk". This was confusing as the arrow pointed across Mission Streets where there was no crosswalk. According to the Department of Public Works - Bureau of Traffic Engineering, the lack of crosswalk and pedestrian signal heads indicate that no pedestrian crossing is allowed. As of 8 February 1979, this condition still existed.

Pedestrian access was also prohibited at the intersection of Main Street and Mission Street (Figure 4) across the west leg of Mission Street and across the I-80 off-ramp adjacent to Main Street. A crosswalk extended across the off-ramp, but there was a barrier between the off-ramp and Main Street that was meant to prohibit pedestrian crossings. Again, the lack of a pedestrian signal head and crosswalk across the Mission Street leg is mean to indicate that no pedestrian crossing is allowed.

Parking

The proposed project is located in an area where there is on-street parking and off-street lots and garages which provide parking for the immediate area and



Legend:

pedestrian counts (6/22/78)
00/00=11-1:30p.m./3:30-5:30p.m.

counts made by
BARTON-ASCHMAN ASSOCIATES, INC.

Pedestrian Access and Counts

Not To Scale

N

FIGURE 4

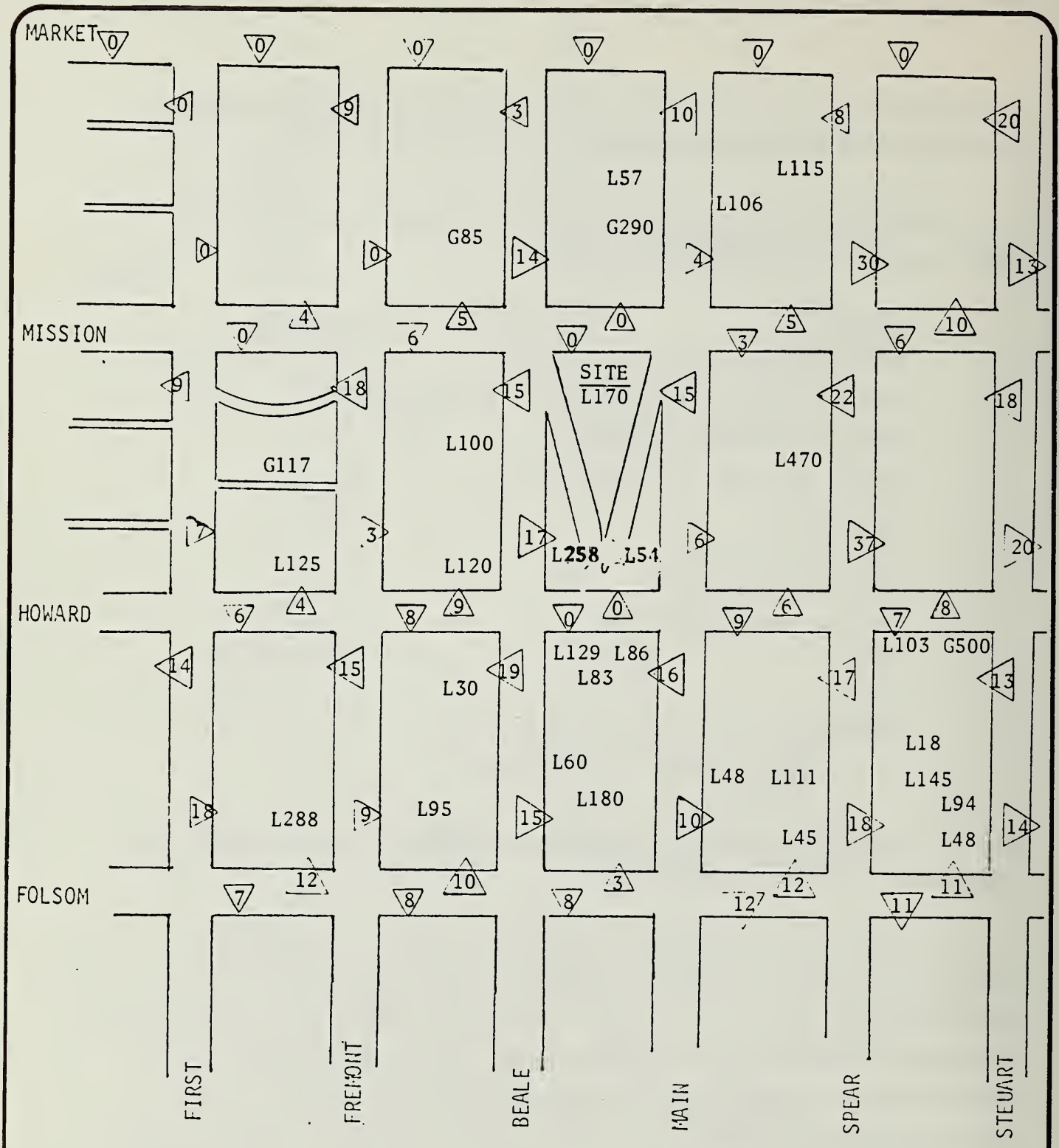
the southern portion of the Financial District. The location and capacity of these lots and on-street parking is shown in Figure 5.

An inventory of off- and on-street parking was made 13 January 1978. The following number of parking spaces were found:

Off-street	4,260 spaces
Meter - 1 Hour - towaway	17
Meter - 1 Hour - no restrictions	402
Meter - 30 Minutes - towaway	22
Meter - 30 Minutes - no restrictions	123
Free - 1 Hour	53
Free - no restrictions	67
Truck Loading - General	188
Truck Loading - Special Zone	18
White	28
Green	3
Red (excludes bus stops and curbs where no parking is allowed along entire face)	40

Of the off-street spaces, approximately 80% are available to the public; that is they could be rented by the hour, day or month.

From observations made during the inventory, most lots were 90-100% full, especially the cheaper all-day lots between Howard and Folsom Streets. Most on-street parking spaces were occupied (approximately 85-95%) and many vehicles appeared to be illegally parked in the loading zones, thus producing double parking by trucks. During the mid-day this produced some congestion but did not appear to be causing any major problems, only minor inconveniences. During the evening peak-hour severe traffic circulation problems could occur. It should be noted that these observations were made during the AC Transit strike so under non-strike conditions the lots may not be as full as attendants interviewed during the inventory stated that they felt the usage of the lots had increased with the strike.



Parking Supply

(on-street & off-street)

00--On-street spaces

L00--Lot spaces

G00--Garage spaces

FIGURE 5

ENVIRONMENTAL IMPACTS

This portion of the report examines the transportation impacts of the proposed project. For the purposes of this discussion, the evening peak-hour will be 4:30-5:30 p.m. as the combined impacts of office and shopping traffic are most severe during this period.

A. Incremental Impacts

Prior to evaluating the impacts of the proposed project, the incremental traffic impacts expected to be produced by other proposed projects in the area must be added to existing conditions. Two projects that have been proposed can be taken into account in this study as EIR's have been completed on them. Located at 333 Market[1] and 45 Fremont Street[2], both are now under construction.

The project at 333 Market and 45 Fremont consists of two new highrise office buildings, a satellite building, a parking garage and a landscaped plaza. The total new space will include 545,000 square feet of occupied space in one highrise, 535,000 square feet in the other highrise and 47,600 square feet in the satellite building. Table 4 shows 7,530 auto trips and 8,150 transit trips would be generated by the project.

The proposed 444 Market Street project would consist of a 38-story office tower and a two-story retail structure totalling 768,000 square feet (gross). Three of the four existing retail/office buildings on this site would be razed. It was estimated the project would generate 6,430 nontransit vehicle trips and 5,610 transit person trips.

[1] Draft Environmental Impact Report Amendment, Proposed 333 Market Street Buildings, San Francisco, California, September 9, 1977, EE 77.98

[2] Final Environmental Impact Report, 444 Market Street, San Francisco, California EE 74.253.

Table 4

TRANSIT AND AUTO[1] VOLUMES PROJECTED FOR OTHER PROJECTS IN STUDY AREA

	Evening Peak-Hour	24-Hour
333 Market[2]		
auto	1,710	7,530
transit	1,860	8,150
444 Market[3]		
auto	1,110	6,430
transit	1,050	5,610
TOTAL AUTO	2,820	13,960
TOTAL TRANSIT	2,910	13,760

[1] vehicle trips

[2] Source: EE 77.98 (Table 1, page 18 for work trips. Non-work trips were computed as 7.5 trips per 1,000 s.f. and mode split was assumed the same as in Table 6 of this report)

[3] Source: EE 74.253 (Tables A4, A5, A7, A8; pages A-17, A-19, A-23, A-24 respectively. Transit peak-hour calculated from Table A4 using footnotes to Table A7)

Other projects that have been proposed within the study area but which have not been fully studied, are the new Transbay Terminal and the Federal Reserve building on the block surrounded by Mission, Market, Main and Spear Streets. The Rincon Annex Post Office on Mission Street, between Spear and Steuart Streets, may be abandoned.

B. Trip Generation and Distribution

Trip generation rates were obtained from the City of San Francisco Planning Department[1]. A rate of 17.5 trips per 1,000 square feet of leasable area was obtained for office type uses and 200 trips per 1,000 square feet of leasable area was obtained for the bank/retail area. It will be assumed that approximately 25% of the bank/retail trips are internal to the building. The number of home-to-work trips was 2 per employee and it was assumed that there was 200 square feet per employee or approximately 2,860 employees.

Trips generated by the project have origin as in four areas of the Bay area: (1) San Francisco, (2) North Bay (Marin County, Sonoma County), (3) East Bay and (4) the Peninsula (San Mateo County and Santa Clara County). Several studies that establish the distribution and mode split have been reported in recent EIR's prepared for the City of San Francisco[2]. Barton-Aschman Associates has just completed an employee survey to update this data that establishes the trip distribution and mode split of the home-to-work trip of persons working in the area of the site. The survey was taken in the One Market Plaza office building and approximately a 12 percent sample was taken. The results of this survey are shown in Table 5 and a sample of the questionaire is shown in Figure 6. Table 6 shows the breakdown of all non-work trips[3].

[1] Discussions with Gail Bloom Planner, Department of City Planning, 20 May 1978.

[2] Transportation Issues and Trends, San Francisco Dept. of City Planning, 1976. Transportation Conditions and Trends, San Francisco Dept. of City Planning, 1975. 1970 Census. Journey to Work, Mode of Transportation of Workers Living in San Francisco, San Francisco Dept. of City Planning, 1974. 1970 Census.

[3] EIR for 444 Market Street (EE74.253) was used to estimate distribution of non-work trips.

Table 5

TRIP DISTRIBUTION AND MODAL SPLIT OF EMPLOYEE WORK TRIPS[1]

	Origin		Modal Split (%)											
			Auto		Bus		BART		Ferry		SPRR		Walk	
	%	Trips	%	Trips	%	Trips	%	Trips	%	Trips	%	Trips	%	Trips
San Francisco	30	1,715	15	255	66	1,140	10	170	--	--	--	--	9	150
Peninsula	17	970	39	380	11	110	16	150	--	--	34	330	--	--
East Bay	40	2,290	29	665	40	915	31	710	--	--	--	--	--	--
North Bay	13	745	26	195	57	420	--	--	17	130	--	--	--	--
	100%	5,720		1,495		2,585		1,030		130		330		150

[1]Survey conducted over the week of June 20, 1978 by Barton-Aschman Associates at One Market Plaza to establish distribution and mode split. DelMonte Corporation (approximately 1,350 employees) and Brobeck, Phleger and Harrison, a law firm (approximately 300 employees) were surveyed. The office complex contains approximately 1,400,000 square feet of which approximately 85 percent was leased at the time of the survey. Assuming 135 square feet per employee (according to Mr. Conahan, building manager) there are 8,700 employees in the complex. The survey was given to approximately 19 percent of the employees in the complex. Of the 1,650 surveys handed out, 1,040 surveys were returned and usable which represents a return rate of 63%. Also, approximately a 12% sample was obtained.

FIGURE 6

TRANSPORTATION SURVEY

This survey is being conducted as a part of an Environmental Impact Report being prepared for a proposed office building on Mission Street at Main and Beale. The City of San Francisco has requested updated figures that describe the travel habits and patterns of persons employed in high-rise office buildings in this area of the City. We would appreciate it if you would fill out the following survey today and return it for collection tomorrow.

1. What is the location of your residence?

   a. East Bay (cross at Bay Bridge) ☐
   b. North Bay (cross at Golden Gate Bridge) ☐
   c. South Bay (come up the peninsula) ☐
   d. San Francisco, zip code _____ ☐

2. How do you usually travel to/from work?

   a. auto - drive alone ☐
   b. carpool, vanpool, number in vehicle _____ ☐
   c. Muni; Route # _____ ☐
   d. BART ☐
   e. AC Transit ☐
   f. Golden Gate Transit ☐
   g. SamTrans ☐
   h. Other _____ ☐

3. If you drive, how far away from the office do you usually park?

   a. 1 Block ☐
   b. 2 Blocks ☐
   c. 3 Blocks ☐
   d. 4 Blocks ☐
   e. Greater than 4 Blocks _____ ☐

4. If you drive, how much do you usually pay to park per day?

   _____

Thank you for filling out this questionnaire.

Table 6

TRIP DISTRIBUTION AND MODAL SPLIT OF NON WORK TRIPS

	Origin		Modal Split					
			Auto		Transit		Walk	
	%	Trips	%	Trips	%	Trips	%	Trips
San Francisco CBD	44	2,490	30	745	30	745	40	1,000
San Francisco	40	2,265	50	1,135	40	905	10	225
Peninsula	7	395	80	315	70	80	--	--
East Bay	7	395	85	335	15	60	--	--
North Bay	2	115	75	85	25	30	--	--
		5,660		2,615		1,820		1,225

Source: Final EIR for 444 Market Street, EE74.253, Table A4, pg A-17.

The project is estimated to generate 11,400 trips over a weekday and 2,600 trips during the peak-hour. Table 7 shows the peak-hour (4:30-5:30 p.m.) trip generation by mode and origin.

Approximately 60% of these trips (1,500 trips) would be by transit during the peak-hour. The 850 trips going by automobile would result in 610 vehicle trips during the peak-hour assuming a 1.4 person per vehicle occupancy rate. There would also be approximately 225 walk trips made during the peak-hour.

C. Traffic and Circulation

Non-transit vehicle trips generated by the project are estimated to be 610 vehicle trips during the peak-hour and 3,000 vehicle trips over the entire day. Because there is less on-site parking then demand generated by the proposed project the impact of most of the 3,000 vehicles trips would be dispersed throughout the study area. As the existing parking lots within the study area are approximately 90-95% full (according to attendants and observations), it may be necessary to park outside the study area which would further disperse trips and reduce impacts on streets immediately adjacent to the site but traffic on streets further away from the project would increase as vehicles would be searching for parking spaces.

Access to the project parking lot would be from Howard Street. Howard Street is four lanes with two lanes in each direction between Main Street and Beale Street. As access to the existing parking lot was from Howard Street and as there would be a net reduction of 14 available parking spaces, the result would be to reduce the number of vehicles desiring access from Howard Street into the lot during the morning and evening peak periods. As Howard Street is two-way in this block, the number of left turns could be reduced, thus reducing delay to through traffic on Howard Street. The driveway into the parking area would be approximately 150 feet long, which would provide enough storage space during the A.M. peak-hour to prevent backups onto Howard Street.

Table 7

PROJECT TRIP GENERATION - PEAK HOUR[1] - 4:30-5:30 (PERSON TRIPS)

	Total Work[2]/ Non-Work	Auto Work/ Non-Work	Bus Work/ Non-Work	BART Work/ Non-Work	Ferry Work/ Non-Work	SPRR Work/ Non-Work	Walk Work/ Non-Work
San Francisco	515/715	80/285	340/215	50/35	--	--	45/180
Peninsula	290/60	115/50	30/0	45/5	--	100/5	--
East Bay	690/60	200/50	275/5	215/5	--	--	--
North Bay	225/15	60/10	125/5	--	40/0	--	--
Sub Total	1,720/850	445/395	770/225	310/45	40/0	100/5	45/180
TOTAL	2,570	850	995	355	40	105	225

Assuming auto occupancy = 1.4 persons per vehicle =

San Francisco	-	260
Peninsula	-	120
East Bay	-	180
North Bay	-	50
TOTAL		610 vehicle trips

Assumptions:

[1]30% of all work trips occur in the pm peak-hour (50% in pm peak period) and 15% of non-work trips occur in the peak-hour.

[2]home-based work trip, 2 trips per employee

[3]business, service, shopping trips, 7.5 trips per 1,000 sq. ft. for office and 200 trips per 1,000 sq. ft. for retail.

The greatest impacts of the vehicle trips generated by the project would be on the on-ramps to I-80 during the evening peak-hour. In October 1976, counts were taken at the Beale Street on-ramp and were found to average, over three days, 830 vehicles westbound and 1,860 eastbound. Depending upon where vehicles are parked, the westbound on-ramp adjacent to the site could have an increase in demand of up to 90 vehicles (10%) and the eastbound ramp adjacent to the site could experience an increase of up to 120 vehicles (6%) during the evening peak-hour. If the freeway and ramps cannot accept these additional vehicles they could backup onto Mission Street and Beale Street and interfere with pedestrian movement and vehicle circulation. The remaining auto trips would use other ramps more convenient to parking lots south of the project site. The freeway is currently operating at a Level of Service 'F'[1] and any additional traffic added to the flows would only increase delay and extend the peak period later into the evening[2]. Approximately 120 additional vehicles would be added to the southbound direction of the freeway and 180 vehicles would be added to the eastbound direction during the evening peak-hour.

D. Transit

The proposed project is projected to generate 1,500 transit trips during the p.m. peak-hour 140 in and 1,360 out). Many of these transit trips would be on MUNI transit facilities but other Bay Area transit would also be used. Table 8 shows existing traffic volumes, capacities and projected loadings for the transit agencies serving the project.

[1] Level of Service 'F' describes forced flow operation at low speeds where volumes are below capacity. These conditions usually result from queries of vehicles backing up from a restrictions downstream. Speeds are reduced substantially and stoppages may occur for short or long periods of time because of downstream congestion. Highway Capacity Manual, 1965, Highway Research Board Special Report 87, pg. 81.

[2] Lynn Newman, Caltrans, telephone conversation, 1/18/78

Table 8

FUTURE PM PEAK-HOUR TRANSIT VOLUMES (OUTBOUND)

	Transit Agency								
		BART							
Project	MUNI	West Bay	East Bay	AC	GG	Ferry	Sam Trans	SPPR	TOTAL
333 Market	550	160	280	350	165	50	65	135	1,775
444 Market	620	190	45	60	25	5	10	30	965
Gateway	440	125	220	275	130	40	30	105	1,365
Total New Trips	1,610	475	545	685	320	95	105	270	4,105
Existing Volumes	13,920	10,900	8,650[1]	6,800[1]	3,900[1]	540[1]	500[1]	4,600	49,820
Future Volumes	15,530	11,375	9,195	7,485	4,220	635	605	4,870	53,925
Capacity[4]	13,805	15,100	7,550[2]	7,500[2]	4,200[2]	700[2]	820	6,000[3]	55,675

[1]Peak-hour assumed 54% peak period.

[2]Peak-hour assumed 50% peak period.

[3]9-10 cars/train, with 100-150 seats per car.

[4]Total available seats.

MUNI

The total increase in MUNI ridership during the peak-hour due to the proposed project and the two Market Street projects would be 1,610 trips outbound of which 440 trips would be generated by the proposed project. The total future volumes on the MUNI lines in the vicinity of the project would be 15,530 trips outbound. The capacity in this location would be 13,805 seats outbound which would result in an overall load factor of 1.1. But, taking into account that some lines are at crush loading conditions now may routes would experience load factors greater than 1.5 ("crush load"). The probable effect of increased loads, especially on routes that are now at or near crush loading conditions, would be to extend the peak-hour and decrease operating speeds because more time would be required for loading and unloading passengers. It is unlikely that the increased loadings during the peak period would produce major mode shifts as the only alternative to transit is the automobile. (The bicycle and walking are other alternatives but are not alternatives that large numbers of people would use) With the current parking policy, the parking supply in the area is decreasing and parking charges are increasing. When it becomes more difficult to find parking spaces and when the cost of parking increases this provides a major disensentive to driving. The Metro should relieve the crush loading conditions to a certain degree, but with all of the new construction occuring within the C-3-O District (Financial District) demand for MUNI should increase and eventually offset any capacity increases associated with the Metro.

Other Transit Services

The impact on other transit service would be similar. AC Transit, Golden Gate Transit and BART all experience crush loads during the evening peak period.

BART is now operating under certain constraints that would not allow reductions in headways. Therefore, the peak would spread out if severe load factors were experienced or a change in mode would occur. AC Transit and Golden Gate Transit would experience crush loads on some lines. The Ferries, SP and Sam Trans could accommodate the expected increases in demand associated with the proposed project and the two other projects in the area. Overloading

any of these systems could create a change in mode but, as with MUNI, the parking supply is becoming a constraining factor on auto use within the study area and the Financial District. It is therefore unlikely that in the long run a major mode shift to the auto would occur.

In general, in the long run, if transit cannot service demand generated by the extensive development occuring in the study area and Financial District, businesses may find it more attractive to locate in other parts of the Bay Area that would be more accessible to employees. Any increases in capacity on the transit lines serving the study area would require increased expenditures by the transit agencies to cover equipment and operating costs. The funds used to cover the increased costs would come from the yearly budgets of transit agency. Increased revenues would also be associated with the increased demand but would not cover the costs.

E. Pedestrians

During the day it is estimated that there would be 11,400 person-trips made to/from the site. They all have some degree of walking included in the trip. There trips could have either of the following purposes:

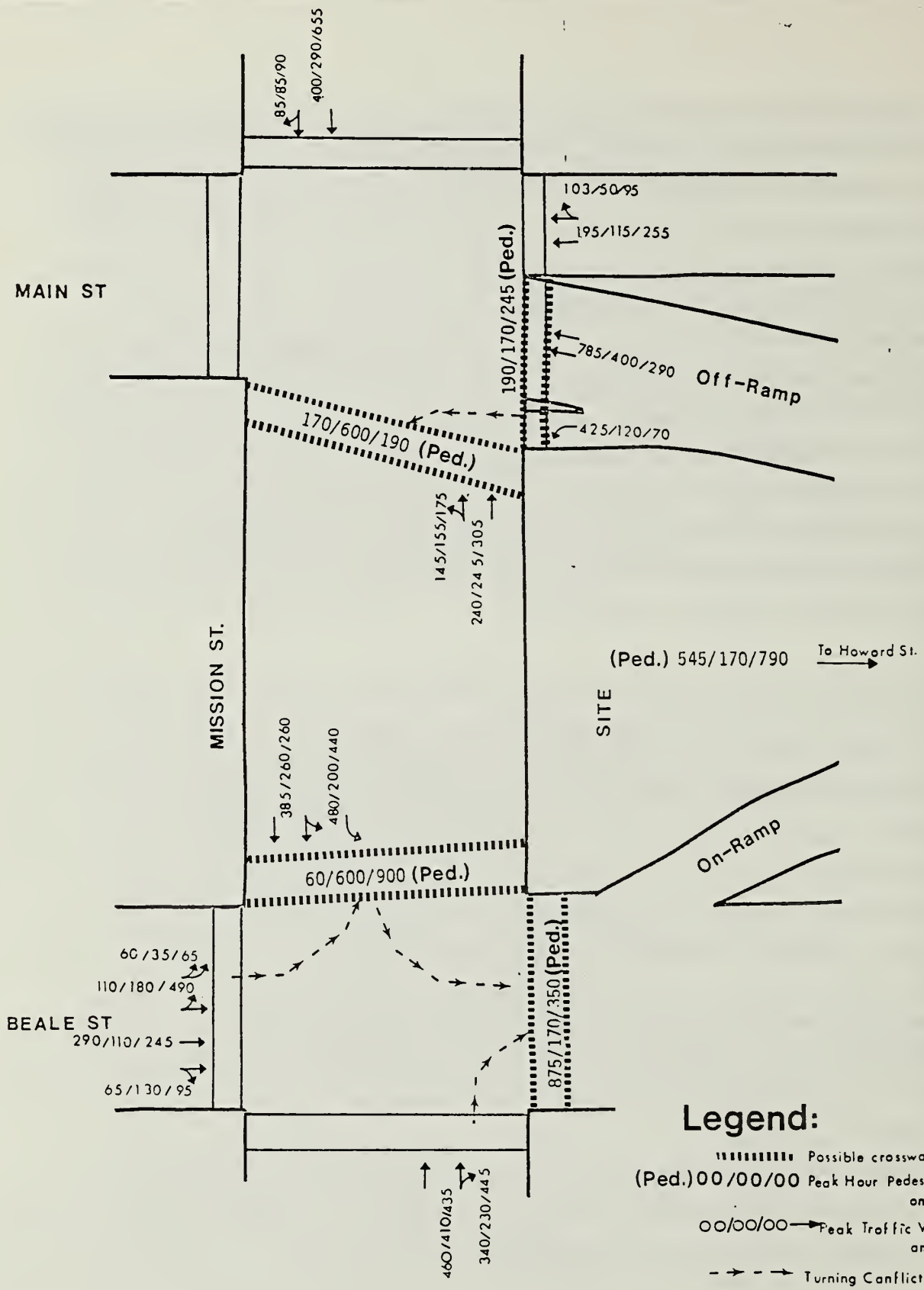
a. travel to/from transit lines or vehicles, and
b. employee and visitor travel to other offices, shops or restaurants.

Areas of pedestrian concern include flows along principal sidewalks and accessibility to the project. During the day there are three time periods during which pedestrian activity is heaviest: (1) A.M. peak-hour, (2) P.M. peak-hour and (3) noon hour.

Of the 11,400 person-trips made during the day, approximately 20% occur in the evening peak-hour and 15% during the two other peak-hours which represents 2,570 trips during the evening peak-hour and 1,710 trips during the noon and A.M. peak-hours. The office building would be oriented so that there would be entrances at the front (on Mission Street) and the back (to the parking area) Pedestrian crossing to the site across Mission Street at Main and Beale currently would not be allowed.

During the morning and evening peak-hours the direction of approach of pedestrians is a function of their mode of arrival and departure. MUNI riders would walk along Mission Street from bus stops and from the Transbay Terminal. East Bay, North Bay and the Peninsula bus riders would arrive and depart from the Transbay Terminal and would also be using Mission Street as access to the project. This would represent approximately 45% of all trips to/from the project. BART riders would approach from the north down Beale or Main Streets. Auto trips would generally be destined for parking lots south of the project as this is the location of cheaper and more plentiful parking. Pedestrian trips associated with these trips would come in from the Howard Street access. Sidewalks will be provided along the driveway. Those persons parking north of the project would use the Mission Street entrance. Figure 7 shows the estimated flow of pedestrians to/from the project assuming pedestrian access is allowed where now prohibited. If no pedestrian access is allowed on Mission, pedestrians would cross illegally rather than walking to Howard Street.

During the noon hour, most of the trips would have destinations north of the project as more restaurants are located in this area and most noon time activity is related to eating. Assuming that 90% of the trips made during the noon hour would use Mission Street and 10% would exit onto Howard Street, Mission Street in front of the office would experience an increase in pedestrian levels from 10-20 trips to 1,540 trips along Mission Street (see Figure 7). The increased pedestrians volumes would interfere with vehicular turning movements to a greater extent than occurs there today. In Figure 7 the pedestrian movements are shown as if crosswalks were provided. If these crosswalks were not provided there would be an increase in illegal pedestrian movements and a greater potential for accidents. The pedestrian/vehicular conflicts, vehicle turning volumes and projected site generated pedestrian volumes, are shown in Figure 7. The traffic volumes were taken by the City on January 23 and 24, 1978. These counts were taken during the AC Transit strike but in comparing these volumes with previous volumes there does not appear to be any increase in traffic. Therefore, the peak period was probably extended to accommodate any additional traffic volumes that occurred during the strike.



Traffic, Pedestrian Volumes

Not To Scale

FIGURE 6

F. Service Vehicles

The mix of service vehicles would include light, medium and heavy trucks[1]. The proposed office building would have three truck loading docks in its parking lot as required by the San Francisco City Planning Code. Trucks would have access to these docks from Howard Street. Turnaround area has been provided in the design of the parking lot so that trucks may both drive in and drive out, except for those trucks delivering oil to the project. No loading would be allowed from Mission Street.

For operations in case of natural gas shut-off, the proposed office building would be heated by oil and deliveries of oil would occur approximately every five days. Due to the amount of oil to be delivered, trucks with two trailers would be required. Because of their size, these trucks would not be able to maneuver within the planned parking lot. Discussions with the Department of Public Works - Bureau of Traffic Engineering indicate that deliveries could be made from Mission Street if they were scheduled to occur in the evening after the rush hour period was over. The trucks would not interfere with traffic at this time nor with the transit diamond lane as it is only in effect between 7:00 a.m. and 6:00 p.m.

G. Parking

The existing use of the property is for parking. Approximately 170 spaces are provided. There would be a net reduction of 14 parking spaces if the conditional use permit is granted and 170 otherwise. The result of reducing available parking would be to disperse trips that are now destined for the parking lot to other lots within the area, thus increasing the demand for parking within the area. Due to the high usage of the lots within the area and the parking policy of making a long-term parking belt south of Folsom Street, these trips may be diverted to lots south of the study area. It should be noted here that the provision of any long-term parking within the C-3-0 zoning is contrary to San Francisco's Master Plan Policy[2]. As parking supplies decrease, there would be a greater incentive to take transit thus aggravating the transit impacts outlined previously.

[1] Light trucks are pickup trucks and vans, medium trucks are panel trucks and heavy trucks are truck trailer combinations.

[2] San Francisco Zoning Code, Section 161 (c), pg 73.

Parking demand, generated by the project would primarily be long-term in nature. Over the day it is estimated that the office building would generate a parking demand for approximately 610 spaces[1].

No provision has yet been made by the developer to provide preferential parking for employees in the building that use carpools or vanpools to get to and from work as no tenants have been signed up yet.

Adequate parking for the handicapped would be provided as required by the City.

[1] 300 spaces for employees (longterm demand) and 310 spaces for non-employees (both short and long term demand).

MITIGATION MEASURES

The following measures would mitigate some of the adverse transportation and circulation impacts of the project.

1. To ensure that no service vehicles use Mission Street for loading, tenants of the office building will be required to use the loading facilities provided in the parking lot. This provision would be incorporated in leases.

2. Due to the pedestrian use of the parking lot for access to Howard Street, provision will be made for a pedestrian walk-way along the driveway.

3. Bicycle facilities will be provided for employees bicles and delivery service bicycles that are both protected from the weather and within sight of the building to provide a measure of security for both employees and delivery service bicycles. Consideration should be given to providing a secure room with the building for the storage of bicycles by employees during the day.

4. Tenants should be encouraged to promote carpooling and vanpooling and operate staggered work hours. With the number of large office buildings under construction and being proposed within the San Francisco Financial District (C-3-0 Zone) this mitigation measure becomes critical if the transportation facilities are expected to accommodate demand generated by the new offices. In particular, staggered work hours appear to be very viable approach. Carpooling and van pooling are valid alternatives but staggared work hours have the potential to mitigate the transportation impacts to a greater degree than car pools and van pools.

   With staggered work hours the existing capacity of transportation facilities serving this area can be better utilized. For transit, if existing capacity is better utilized, extensive capatial expenditures and operating costs would not be required to meet increased demand and therefore more costs would be covered through the fare box.

To promote carpooling and vanpooling, priority parking should be provided. The developer has investigated leasing the remaining space under the freeway off-ramps adjacent to the site. This land is put up for bid each year to commercial leasers and is leased to the highest bidder. Within the next fiscal year, 40% of all spaces on, Caltrans property will be reserved for Van Pools at $10.00 a month per space[1] no matter who leases the property. Therefore, there would be approximately 45 Van Pool parking spaces within the two parking lots under the Main and Beale ramps assuming a self-park parking system. The proximity of these spaces to the proposed office provide an insentive for Van Pooling by employees in the building.

5. New crosswalks should be considered at four locations: (1) the south leg of Beale Street, (2) the east leg of Mission Street, (3) the west leg of Mission Street and (4) the south leg of Main Street. Each of these crosswalks would affect the operations of their respective intersections to varying degrees depending upon the extent to which the crosswalks conflict with turning movements. The Department of Public Works, Bureau of Traffic Engineering has examined the problem of pedestrian access to site and has proposed a plan for for the Mission and Beale Street intersection and two plans for the Mission and Main Street intersection.

   The Mission and Beale Street plan provides full pedestrian access to the site. That is, new crosswalks would be provided across both Mission and Beale Streets. The proposal would require a modification in the signal phasing, lane restriping and a pedestrian island in the middle of the south leg of Beale Street. The crosswalk on the south leg of Beale Street would interfere with two turning movements (Figure 6) which are heavy in the peak-hour. While pedestrians were crossing approximately, 880 vehicles would be crossing their path. The crosswalk across Mission would experience a conflict with one minor turning movement that varies between 35 and 65 vehicles during the three peak periods (approximately one vehicle per signal cycle or less). As there are no conflicting vehicle movements, vehicles turning here should not have any great difficulty crossing large volumes of pedestrians.

[1] Mr. M.C. McCarthy, Caltrans, telephone discussion 3/1/79.

The plan the City favors for the Mission and Main Street intersection, would only include a crosswalk across Main Street and the off-ramp. This provides the greatest protection for pedestrians and the best signal phasing for the operation of the intersection. This plan would call for some new lane striping, channelization and signal phasing. This crosswalk would be the safest of those under consideration and produce the least disruption to traffic circulation because there would be no pedestrian/ vehicular conflicts. Pedestrians would be completely protected.

The second phase would include the Main Street crosswalk plus a crosswalk across Mission Street. The operation of the intersection would not be as smooth and storage gained with the new channelization under Plan 1 would be lost but pedestrians would have better access to the site. This crosswalk would be relatively protected with only one vehicular movement conflicting with the pedestrian movement.

The question that must be asked when evaluating the safety to pedestrians of each of these crosswalks is that if the crosswalk were not provided and pedestrians cross anyway, (as occurs at this time) will the hazards to both pedestrians and vehicles be worth the improved operation of the intersection?

These plans would also involve the moving of the bus stop on the southwest corner of the Mission/Beale intersection to the southeast corner and terminating the eastbound diamond transit preferential lane at Beale Street rather than Main Street. This would provide better transit access to the site and the right turn movement from Mission to Beale would move better with the far side bus stop. The diamond lane on the north side of Mission would be retained to discourage "drop-offs".

APPENDIX C.

Air Quality Assumptions and Calculations

Appendix C-1: Space Heating Emissions Calculations

A. Natural Gas

Peak month daily natural gas use: = 19,320 cu.feet.

Emission rates:[1]

Suspended Particulates:	15 lbs/10^6cu.ft.
Carbon Monoxide:	20 lbs/10^6cu.ft.
Hydrocarbons:	8 lbs/10^6cu.ft.
Oxides of Nitrogen:	120 lbs/10^6cu.ft.

Daily Emissions

Suspended Particulates:	0.019 x 15 = 0.3 lbs/day
Carbon Monoxide:	0.019 x 20 = 0.4 lbs/day
Hydrocarbons:	0.019 x 8 = 0.2 lbs/day
Oxides of Nitrogen:	0.019 x 120 = 2.3 lbs/day

B. Fuel Oil

The building would have a standby fuel oil heating system to be used only in case of natural gas supply interuption. To supply an equivalent amount of heat to the 19,320 cu. feet of natural gas estimated during January, 145 gallons of distillate oil per day would have to be burned.

Emission factors for distillate oil are:

Particulates:	15 lbs per 10^3gallons
Sulfur Dioxide	76 lbs per 10^3gallons

---

[1] U.S. E.P.A., Compilation of Air Pollutant Emission Factors, Second Edition, December 1975.

Carbon Monoxide	4 lbs per 10^3 gallons
Hydrocarbons	3 lbs per 10^3 gallons
Oxides of Nitrogen	60 lbs per 10^3 gallons.

The resulting daily emissions are:

Particulates	2.1 lbs/day
Sulfur Dioxide	11.0 lbs/day
Carbon Monoxide	0.6 lbs/day
Hydrocarbons	0.4 lbs/day
Oxides of Nitrogen	8.7 lbs/day

Appendix C-2: Carbon Monoxide Calculations

The Mission Street-Beale Street intersection was selected for analysis because it would be the location of greatest impact. The peak one- and eight-hour traffic periods were selected for analysis.

Traffic levels on both streets were developed by the project traffic engineer. both the impact of the proposed project and other nearby highrise office buildings that are now under construction were quantified. Traffic volumes used in the analysis are shown below:

Street	Existing Volume		1980 with other projects		1980 with project	
	1 hr.	8 hr.	1 hr.	8 hr.	1 hr.	8 hr.
Mission Street	1200	6600	1295	6950	1350	7100
Beale Street	900	4325	1020	4575	1075	4675

During the peak hour at this intersection, the level of service is poor, so an average vehicle speed of 10 mph

was selected. During the 8-hour peak traffic period, an average vehicle speed of 15 mph was assumed. Emission factors were calculated using the same methodology described in Appendix C-3.

The model used was developed by the Bay Area Air Quality Management District.[1] The model used consisted of two superimposed line sources representing Mission Street and Beale Street. Meteorological conditions assumed consisted of a 1 meter per second (mps), and 2 mps wind blowing at a 22 1/2 degree angle to the roadway for the one- and eight-hour periods, respectively. Use of this model provides conservative estimates, as it is a physical impossibility to have a wind blowing at the same angle to both roadways simultaneously. The results are shown in the table of ambient concentrations of CO below.

	Mission St. Contribution	Beale St. Contribution	Total
	(in parts per million)		
Existing			
1-hour	4.0	3.0	7.0
8-hour	1.1	1.0	2.1
1980 with other projects			
1-hour	3.6	2.8	6.4
8-hour	1.0	1.0	2.0
1980 with project			
1-hour	3.8	3.0	6.8
8-hour	1.1	1.0	2.1

[1] BAAPCD, Guidelines for the Air Quality Impact Analysis of Projects, June 1975.

Appendix C-3: Regional Automobile Emissions

1. VMT (Vehicle Miles Travelled) Calculation

Trip Origin	Percent of total trips	Percent of auto trips	One-way distance (mi)	VMT contribution
San Francisco	62	28	5	1900
Peninsula	18	75	20	6000
East Bay	14	44	20	2700
North Bay	6	65	20	1700
Total VMT				12,300

2. Emission Factors (grams per mile)

Pollutant	BAAPCD Emission[1] factors for 1980	Correction[2] factor	Speed correction	Emission factor
Carbon Monoxide	16.8 g/mi	1.41	0.80	18.95 g/mi
Hydrocarbons	2.4 g/mi	1.10	0.85	2.24 g/mi
Oxides of Nitrogen	2.8 g/mi	.94	1.05	2.76 g/mi

3. Emission Calculations

Carbon Monoxide: 12,300 mi x 18.95 g/mi = 512 lbs/day

Hydrocarbons: 12,300 mi x 2.24 g/mi = 60 lbs/day

Oxides of Nitrogen 12,300 x 2.76 g/mi = 74 lbs/day

See impacts for total project emissions comparison to regional emissions.

---

[1] BAAPCD, Guidelines for Air Quality Impact Analysis of Projects, June 1975.

[2] Association of Bay Area Governments, ABAG Memo from Ron Wada to Mike Kim, dated July 18, 1977.

APPENDIX D.

An Investigation of Sun Reflection Effects on Drivers for the Proposed Pacific Gateway Project

by

Donald Ballanti,

Consulting Meteorologist

Introduction

The Pacific Gateway Office Building is proposed for a site in San Francisco that is bounded on two sides by freeway ramps. Experience in San Francisco has shown that highrise office buildings, which often use highly reflective window glass, can represent a hazard to drivers when they reflect sunlight. Window reflections could possibly temporarily blind drivers or distract them, and could in some cases be dangerous.

The purpose of this analysis is to assess the potential for this problem based on the geometry of the proposed building and the path of the sun in the sky at San Francisco's latitude.

Sun-Building Geometry

Sunlight reflections would appear to be a potential problem only at the offramp to the north of the site. As reflections could only reach this offramp from the southeast face of the proposed structure, only the southeast side of the building was considered.

The important factors determining the path of a reflection are the orientation of the building and the sun azimuth and elevation angles. The azimuth is the direction to the sun, measured in degrees. North is considered zero degrees, and the azimuth is measured clockwise from north, with east at 90°, south at 120°, and west at 270°.

The sun elevation angle is the angle between the sun, the observer, and the horizon. Thus the horizon is zero degrees, and directly up is 90 degrees.

At any point along the freeway offramp, reflection of sunlight can

only occur for a discrete range of sun azimuth. The width of this range increases as one moves closer to the structure.

The range of azimuth angles that can potentially cause reflections has been calculated and is summarized below in Table 1 for different distances from the southwest wall.

Table 1

Distance from Southwest Wall	Range of azimuth that could cause a reflection
50 feet	173° - 209°
100 feet	157° - 196°
200 feet	146° - 177°
300 feet	143° - 166°
400 feet	141° - 160°

The other factor that will determine a reflection path is the elevation angle. The sun elevation angles vary with the time of day and the season. Sun elevations are lowest in winter and highest in summer.

Reflections can only reach a driver's eye if they have low elevation angles. This is because the roof of the automobile shades the drivers when the light source is above a certain angle. For the purpose of this analysis, an elevation angle of 30° was selected as a conservative value for this critical angle. Reflections are therefore not considered a problem unless they have an elevation angle of 30 degrees or less. The downward slope of the freeway ramp, which would tend to lower the elevation angle at which light affects drivers, was not considered.

A sun angle calculator was used to predict when the appropriate combinations of azimuth and elevation would occur at the five locations being analyzed. The results of this analysis are shown below in Table 2.

Table 2

Distance from southeast face	Dates	Maximum Duration
50 feet	Dec 11 - Jan 1 Nov 21 - Jan 15	11:20 - 11:40 a.m. 12:40 - 1:00 p.m.
100 feet	Nov 21 - Jan 21	10:30 - 11:30 a.m.
200 feet	Nov 6 - Feb 6	9:40 - 11:40 a.m.
300 feet	Nov 3 - Feb 9	9:30 - 11:00 a.m.
400 feet	Nov 1 - Feb 11	9:20 - 10:40 a.m.

The dates in Table 2 represent the period that a reflection could occur, regardless of duration. The actual period of time when a reflection would occur would only be momentary at the first date shown, and would increase to a maximum on December 21. The maximum durations shown are for December 21. The duration would then decrease until the last date shown, at which time no reflection would occur.

The maximum total duration of reflection occurs at 200 feet from the building. A reflection would be present at this location about 2.5% of the daylight hours during the year, ignoring the effects of cloudiness. During December and January, San Francisco receives about 45% of the available sunshine, so that the combination of the required sun angle and clear skies would occur about 1% of the total daylight hours.

Reflection Severity

The hazard to drivers is a function of two factors. The strength of the reflection and the angle that it makes with the roadway are both important.

The strength of the reflection is strongly influenced by the angle of incidence to the building face. When light strikes glass, a portion of

the energy is transmitted through the glass, a portion is absorbed by the glass, and the remainder is reflected. The reflected portion is least when the light approaches the window normally (at a right angle) and is greatest when it approaches the window obliquely (at small angles, from the side). At very small angles of incidence, almost all the light is reflected; at large incidence angles, almost all the light is transmitted.

For the proposed building, the largest angle of incidence, and weakest reflection, would occur when the sun has an azimuth of 135° (southeast). Examination of Table 1 shows that the angles of incidence during the time that reflections to the road are possible range from 6° to 74°, and are summarized below in Table 3.

Table 3

Distance from Southeast Face	Angles of Incidence
50 feet	38° - 74°
100 feet	22° - 61°
200 feet	11° - 42°
300 feet	8° - 31°
400 feet	6° - 25°

The proportion of incident light reflected would not be significant for angles of incidence less than 45°, as most would be transmitted. The above table shows, therefore, that strong reflections could only occur within 100 feet of the building. At greater distances, most of the sunlight would be transmitted through the window glass, rather than reflected.

Besides the strength of the reflection, the angle at which it approaches a driver is also important. Reflections that occur at small angles to the driver's line-of-sight would be most disturbing (the sunlight

would be coming directly into the face of the driver). For this building, the angle formed with the drivers' line-of-sight is identical to the angle of incidence shown in Table 3. Thus, since strong reflections would only occur at angles of incidence greater than 45°, these reflections would be coming towards the driver at an angle of greater than 45° from the left. At angles of this size, they would not even temporarily blind a driver, but could be distracting.

Another factor ignored up to this point is the fraction of the building face that is glass. The proposed building is about 27% glass, so that only a small portion of the incident light would be reflected.

Summary

The building and off-ramp geometry is such that reflections from the building to the offramp would only occur during the morning in winter, and then only for a period that averages less than half an hour. When cloudiness is considered, at the worst point reflections could occur about 1 percent of daylight hours.

The geometry also limits the strength of the reflections, which would be significant only within 100 feet of the building. At this distance from the building, the reflections would be approaching the driver at a minimum 45° angle from the side. Finally, the low percentage of glass on the building face and the low reflectivity of the glass to be used would limit the amount of reflected sunshine.

Because of the above factors, it appears that reflections from the building would not be a hazard to drivers. For a short period of time on winter mornings, drivers using the ramp would see reflections from the buildings, but their strength and angle would be such that it is unlikely to be a problem.

APPENDIX E

Fundamental Concepts Of Environmental Noise

This section provides background information to aid in understanding the technical aspects of the noise sections of the EIR.

Dimensions of Environmental Noise

Three dimensions of environmental noise are important in determining subjective response. These are:

1. the intensity or level of the sound;
2. the frequency spectrum of the sound;
3. the time-varying character of the sound.

Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB), with 0 dB corresponding roughly to the threshold of hearing.

The "frequency" of a sound refers to the number of complete pressure fluctuations per second in the sound. The unit of measurement is the cycle per second (cps) or Hertz (Hz). Most of the sounds which we hear in the environment do not consist of a single frequency, but of a broad band of frequencies, differing in level. The quantitative expression of the frequency and level content of a sound is its sound spectrum. A sound spectrum for engineering purposes is typically described in terms of octave bands which separate the audible frequency range (for human beings, from about 20 to 20,000 Hz) into nine segments.

Many rating methods have been devised to permit comparisons of sounds having different spectra. Fortunately, the simplest method correlates with human response

practically as well as the more complex methods. This method consists of evaluating all of the content of a sound in accordance with a weighting that progressively and severely deemphasizes the importance of frequency components below 1000 Hz, with mild deemphasis above 5000 Hz. This type of frequency weighting reflects the fact that human hearing is less sensitive at low frequencies and extreme high frequencies than in the frequency midrange. The weighting curve most often used is called "A" weighting, and the level so measured is called the "A-weighted sound level," or simply "A-level."

The A-level in decibels is expressed in "dBA"; the appended letter "A" is a reminder of the particular kind of weighting used for the measurement. In practice, the A-level of a sound source is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve. All U.S. and international standard sound level meters include such a filter. Typical A-levels measured in the environment and in industry are shown in figure D-1.

Although the A-level may adequately describe environmental noise at any instant in time, the fact is that the community noise level varies continuously. Most environmental noise includes a conglomeration of distant noise sources which creates a relatively steady background noise in which no particular source is identifiable. These distant sources may include traffic, wind in trees, industrial activities, etc. These noise sources are relatively constant from moment to moment, but vary slowly from hour to hour as natural forces

	Decibels, A-Weighted	
Civil defense siren (100')	140	
Jet takeoff (200')	130	
	120	
Riveting machine	110	Rock music band
Emergency engine-generator (6') DC-10 flyover (700')	100	Pile driver (50')
Textile weaving plant Subway train (20')	90	Boiler room Printing press plant
Pneumatic drill (50')	80	Garbage disposal in home (3') Inside sport car, 50 mph
Freight train (100') Vacuum cleaner (10') Speech (1')	70	
	60	Auto traffic near freeway Large store Accounting office
Large transformer (200')	50	Private business office Light traffic (100') Average residence
	40	Minimum levels, residential Areas in San Francisco at night
Soft whisper (5')	30	
Rustling leaves	20	Recording studio
	10	
Threshold of hearing in youths (1000-4000 Hz)	0	

Figure C-1: Typical Sound Levels Measured in the Environment and in Industry

Note: The distance (in feet) between the source and listener is shown in parentheses.

change or as human activity follows its daily cycle. Superimposed on this slowly varying background is a succession of identifiable noisy events of brief duration. These may include nearby activities or single vehicle passages, aircraft flyovers, etc., which cause the environmental noise level to vary from instant to instant.

To describe the time-varying character of environmental noise, the statistical noise descriptors L_{10}, L_{50}, and L_{90} are commonly used. The L_{10} is the A-weighted sound level equaled or exceeded during 10 percent of a stated time period. The L_{10} is considered a good measure of the "average peak" noise. The L_{50} is the A-weighted sound level that is equaled or exceeded 50 percent of a stated time period. The L_{50} represents the median sound level. The L_{90} is the A-weighted sound level equaled or exceeded during 90 percent of a stated time period. The L_{90} is used to describe the background noise.

As is it often cumbersome to describe the noise environment with these statistical descriptors, a single number descriptor called the L_{eq} is becoming widely used. The L_{eq} is defined as the equivalent steady-state sound level which in a stated period of time would contain the same acoustic energy as the time-varying sound level during the same time period. The L_{eq} is particularly useful in describing the subjective change in an environment where the source of noise remains the same but there is change in the level of activity. Widening roads and/or increasing traffic are examples of this kind of situation.

In determining the daily measure of environmental noise, it is important to account for the difference in response of people to daytime and nighttime noises.

During the nighttime, exterior background noises are generally lower than the daytime levels. However most household noise also decreases at night and exterior noises become very noticeable. Further most people are sleeping at night and are very snesitive to noise intrusion.

To account for human sensitivity to nighttime noise levels a descriptor L_{dn} (day-night equivalent sound level) was developed. The L_{dn} divides the 24-hour day into the daytime of 7 am to 10 pm and the nighttime of 10 pm to 7 am. The nighttime noise level is weighted 10 dB higher than the daytime noise level. The L_{dn} is the A-weighted average sound level in decibels during a 24-hour period with a 10 dBA weighting applied to nighttime. For highway noise environments the L_{eq} during the peak traffic hour is approximately equal to the L_{dn}.

Appendix F

AN INVESTIGATION OF PREVIOUS SITE DISTURBANCE FOR THE PACIFIC GATEWAY PROJECT

The Pacific Gateway Project would be located on the block bounded by Mission Street, Howard Street, Beale Street and Main Street. This block has repeatedly been disturbed and modified in the past.

The disturbance of the site is relevant because of the potential of archeological or historical artifacts being affected by the proposed project. The site was filled during the 1880's, and it is possible that gold-rush period artifacts may have been buried by the fill. Entire ship hulks are known to have been buried by the filling of the San Francisco Bay waterfront.

Of importance in determining the probability of uncovering artifacts is the previous construction of basements, or other activities on-site that would involve excavation. Where excavation has previously taken place, artifacts were presumably either destroyed or removed.

The shaded areas in Figure F-1 show the known location of basements. Figure F-1 was prepared using data from the San Francisco Department of Public Works building permit files. Copies of building permits on microfiche were obtained.* The information on Figure F-1 is for buildings constructed after 1906. Information about basements of pre-1906 buildings on the site is not available.

---

*Available for public review at 45 Hyde Street, Room 319, San Francisco.

The 147-149 Beale Street lots were developed in 1907 as a brick building on piles, with a basement, and a frame building. These were dismantled for the construction of the Key System elevated railway, which involved excavation for large concrete columns to support the railway. These lots were again excavated in the 1960's when the Key System was dismantled and the freeway ramps constructed.

Also relevant to the potential for archeological resources on the site is the presence of piles driven to provide support for previous structures. Any large or fragile artifact, such as a wooden gold-rush ship, would be destroyed if piles were driven through it.

The building permits obtained included building plans which gave the location of piles. These were wooden piles, generally capped at 12 feet below grade, in structures with basements, and capped a few feet below the surface for buildings without basements. Pile lengths would be 60 to 90 feet.

Figure F-1 shows the location and arrangement of piles on the site. The number of piles is not accurately depicted in this figure, but the general location is. Piles for 147-149 Beale Street are not shown, although it is known that a brick building on piles occurpied the site prior to construction of the Key System.

The construction of the freeway ramps and Key System (now bus ramps to the East Bay Terminal) involved excavation and pile driving. Construction plans obtained from the

California Department of Transportation show that the camps adjacent the proposed building are supported by concrete piles spaced at from 6 to 12 post intervals, driven to a depth of 55 to 65 feet. Excavation for this portion of the ramps was not deeper than 4 to 6 feet and extended only to the site boundaries. As the elevation of the ramps increase to the south, the density of piles increases, with piles spaced at 4 to 12 feet. Near Howard Street, the ramps are supported on columns iwth footings that are 12 feet by 9 feet. Each footing is supported by groups of 11 to 18 pilings, driven to a depth of 45 to 60 feet.

The Key System (now East Bay Terminal ramps) was supported by groups of 4 concrete columns, with groups spaced about forth feet apart. Each column is supported by 4 piles, drawn to a depth of 60-65 feet. There are 24 columns within the site of the 147-149 Beale Street shown in Figure F-1.

A total of 1630 wooden piles are estimated to have been driven on the site since 1906. The location and number of piles in existence prior to 1906 is not known. Of these, approximately 465 are located within the area to be excavated for te basement of the highrise office Building. The following is a summary of buildings fomerly located on the site of the proposed project.

201 Mission Street

SW corner of Mission and Main Streets. Lot has approximately 90' frontage on Mission Street and approximately 70' frontage on Main Street.

Copies of building permits obtained from San Francisco Department of Public Works and photograph from Cal-Trans.

Photo shows improvements were used for a Shell Oil service station.

Constructed 1916.

Slab on grade construction.

No record of excavation; however, at least two fuel oil, subsurface storage tanks were required for service station use.

Size or depth of the tanks are unknown.

235 Mission Street

Located 91' from SE corner of Mission and Beale Streets. Lot has approximately 45' frontage on Mission Street with depth of 137'6".

Copies of building permits and plans obtained from DPW. Appraisal data and photographs obtained from Cal-Trans.

Permits and plans show a 3-story brick loft building with basement; however, photograph illustrates a 4-story building.

Constructed 1911.

Foundation is on piles with bottom of pile caps approximately 12' from top of sidewalk.

257 Mission Street

Located 45'10" from SE corner of Mission and Beale Streets. Lot has 45'10" frontage on Mission Street with depth of 137'6".

Copies of building permits and building plans obtained from DPW. Appraisal data and photograph obtained from Cal-Trans.

Permits and plan show a 2-story brick loft building with basement.

Constructed 1912.

Foundation is on piles with bottom of pile caps approximately 13' from top of sidewalk.

111 Beale Street

Located at corner of Mission and Beale Streets. Lot has 45'10" frontage on Mission Street and 100' frontage on Beale Street.

No building permits or plans available; however, appraisal data obtained from Cal-Trans shows a 1-story brick building covering entire site.

121 Beale Street

Located 100' from SE corner of Mission and Beale Streets. Lot has 37'6" frontage on Beale Street with depth of 45'10".

No building permits or plans available; however, photographs obtained from Cal-Trans show a 2-story brick building. Buildings of this type had foundation on piles. Estimate 96 piles.

125 Beale Street

Located 137'6" from SE corner of Mission and Beale Streets. Lot has approximately 45'10" frontage on Beale Street with depth of 137'6".

Copies of building permits and building plans obtained from DPW. Appraisal data and photograph obtained from Cal-Trans.

Permits and plans show a 2-story reinforced concrete garage building.

Constructed 1922.

Foundation is on piles with bottom of pile approximately 12' from top of sidewalk.

133 Beale Street

Located approximately 183' from SE corner of Mission and Beale Streets. Lot has approximately 45'10" frontage on Beale Street with depth of 137'6".

Copies of building permits obtained from DPW. Appraisal data and photograph obtained from Cal-Trans.

Permits show a 1-story with mezzanine concrete building.

Constructed 1919.

18" concrete footings - no piles.

149 Beale Street

Located approximately 228' from SE corner of Mission and Beale Streets.

Copy of building permit obtained from DPW shows a 1-story frame and galvanized iron building.

Constructed 1906.

Foundation is redwood 3" x 12" boards.

118 Main Street

Located 70' from SW corner of Mission and Main Streets. Lot has approximately 45' frontage on Main Street with depth of 91'8".

Copies of building permits and plans obtained from DPW. Appraisal data and photographs obtained from Cal-Trans.

Permits and plans show a 3-story brick loft building with basement fronting on Main Street and an adjoining 1-story corrugated metal shop structure with access to Mission Street.

Constructed 1910.

Foundation is on piles (153) with bottom of pile caps approximately 13' from top of sidewalk.

120 Main Street

Located approximately 115' from SW corner of Mission and Main Streets. Lot has approximately 22'6" frontage on Main Street with depth of 91'8".

Copies of building permits obtained from DPW. Appraisal data and photographs obtained from Cal-Trans.

Permits show a 1-story concrete building with mezzanine.

Constructed 1928.

Foundation is on piles (60).

124 Main Street

Located approximately 137'6" from SW corner of Mission and Main Streets. Lot has frontage of approximately 45' with depth of 137'6".

Copies of withdrawn alteration permits dated 1934 obtained. Appraisal data and photograph obtained from Cal-Trans.

Permits and photo show a 3-story warehouse building with basement.

Foundation is on piles (159±).

132-42 Main Street & 141 Beale Street

Located approximately 182'6" from SW corner of Mission and Main Streets. Lots have frontage of approximately 90' on Main Street and 45' on Beale Street with depth of 137'6". Total three lots.

Copies of permits obtained from DPW.
Appraisal data and photographs obtained from Cal-Trans.

Permits show frame buildings.

Constructed 1912.

150 Main Street

Located approximately 229' from NW corner of Howard and Main Streets.
Lot has frontage of 45' on Main Street with depth of 137'6".

Copies of permits obtained from DPW.
Appraisal data and photograph obtained from Cal-Trans.

Permits and photo show a 2-story brick structure.

Constructed 1906 using concrete foundation from a former 3-story building destroyed by 1906 earthquake.

Foundation on piles (159±).

170 Main Street

Located approximately 137' from NW corner of Howard and Main Streets.
Lot has frontage of 91'6" on Main Street with depth of 137'6".

Copies of permits and building plans obtained from DPW.
Appraisal data and photograph obtained from Cal-Trans.

Plans and photo show a 2-story reinforced concrete garage building erected 1924 by Cahill Bros. Inc.

Foundation utilized a sub-structure remaining from a former building and part rests upon 186 piles driven at time of construction. Estimate no less than 209 piles required for total building.

190 Main Street

Located at SW corner Howard and Main Streets.
Lot has 137'6" frontage on both streets.

Appraisal data and photographs obtained from Cal-Trans.

Data shows a 2-story with basement reinforced concrete building constructed in 1926.

Foundation on reinforced concrete caps on 365 wood piles.

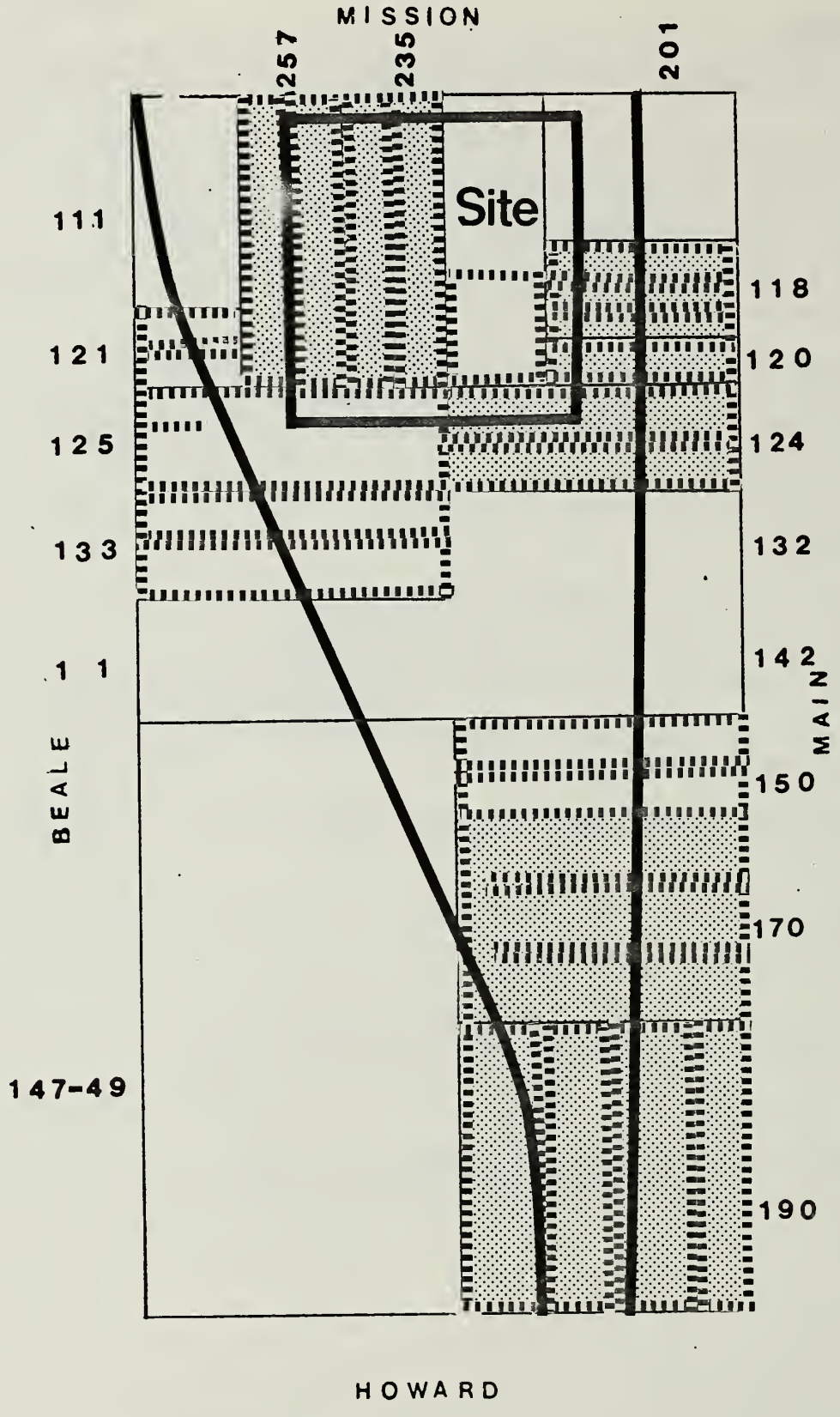

MISSION
257
235
201
Site
111
121
125
133
1 1
118
120
124
132
142
MAIN
150
170
190
147-49
BEALE
HOWARD
BASEMENT
PILES
N

FIGURE F-1